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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. ROSELL, J. M. (1933). La mammite streptococcique de la vache. [**Streptococcic Mastitis of the Cow**].—pp. 108. 31 figs., 1 plate, 3 tables. [144 refs.] Quebec: Min. Agric.

II. ROSELL, J. M. (1933). **What is Streptococcus mastitidis?**—*Cornell Vet.* **23.** 169-176. 1 table. [44 refs.]

I. In this monograph Rosell collects and discusses the results which he has published alone or in collaboration with other workers on mastitis, together with observations of a more general nature. Introducing his subject with a consideration of the widespread nature and economic importance of streptococcic mastitis in all countries where it has been looked for, the author passes to a section on the nature, aetiology, clinical aspect and course of the disease together with a short historical summary.

Diagnosis is next discussed in two parts, one of which deals in detail with clinical, biochemical and microscopic methods of examination and with the sediment test, the other with diagnosis by bacteriological means. Under this heading various methods of examination are discussed and the characters of typical mastitis streptococci compared with those of others which may be found in milk. The author has found the cultural method less sure than those methods based on the chemical changes in the milk (pH, catalase, chlorides).

The last chapter deals with treatment by chemotherapeutic methods, and by simultaneous vaccine and protein therapy—a method recommended by the author —with prevention by hygienic measures based on professional examination, and lastly with vaccination.

The author believes that the greater number of infected animals can be detected on the farm by relatively simple means. He recommends the reaction test made in tubes with brom-thymol-blue, followed by a black filter test and finally, after the udders have been stripped, a clinical examination. Results of a doubtful nature must nevertheless be checked by laboratory examination.

There are numerous spelling errors, particularly in regard to names of foreign workers, which it is hoped will be corrected in a subsequent impression.

II. Citing the various workers who have described the characters of mastitis and other milk streptococci, Rosell discusses the terms used for mastitis streptococci, pointing out first the fact that the strains referred to by HADLEY and FROST as *Str. mitis* are indistinguishable from *Str. mastitidis* (*agalactiae*) by fermentation tests and other tests more appropriate to the characterization of streptococci and

secondly, putting forward the view that β haemolytic streptococci should not be included under the term *Str. mastitidis* (*agalactiae*).—A. W. STABLEFORTH.

I. GÄTJEN. (1933). Der gelbe Galt in der Praxis. **[Mastitis in Practice]**.—*Münch. tierärztl. Wschr.* **84.** 525-529. 5 tables.

II. PLASTRIDGE, W. N., & ANDERSON, E. O. (1933). **Infectious Bovine Mastitis. I. The Bromthymol Blue Test in the Diagnosis of Mastitis.**—*Storrs Agric. Expt. Sta. Bull.* No. 184. pp. 17. 5 tables, 1 chart. [12 refs.]

I. Of about 2,500 cows which were under routine examination for a period of four years (34,000 examinations), 1,207 showed definite mastitis, i.e. mastitis streptococci, increased cells, and abnormal deposit or obvious changes in the udder on one or more occasions ; 309 cases were detected at the first examination. These examinations did not include a cultural test.

Cases were most frequent when the number of fresh calves was greatest, especially if these were heifers. Streptococci and changes in the milk were more frequent in the fore-milk or in the strippings than in mid-milk. They varied greatly from time to time. Although loss of quarters is to be feared, Gätjen does not think that mastitis is of great economic importance, nor does he believe that it is notably contagious.

He agrees with most other workers on this subject, however, that the only effective way of dealing with the disease is by segregation of infected animals and adequate precautions against infection of other animals. Therapy has been unsatisfactory so far and, although thorough milking may reduce clinical symptoms of the disease, it does not get rid of the causal streptococci. On the other hand, bad milking does not in itself produce streptococcic mastitis.

He points out the difficulty that farmers have in complying with the regulations forbidding the sale of milk containing mastitis secretion.

II. During a period of 16 months, observations were made weekly on a herd of 80 cows. In many cases, daily tests were made during the first 15 and the last 15 days of lactation.

The results showed that in general the reaction test is of no value in detecting healthy carriers of organisms commonly associated with mastitis, that it is of slight value in detecting mild cases and may be expected to give colour reactions indicative of mastitis in about 70 per cent. of tests when applied to samples from quarters which frequently give milk which is abnormal in appearance. Mixed samples were useless.—A. W. STABLEFORTH.

KÄSTLI, P. (1933). Systematische Erhebungen über den gelben Galt im Kontrollgebiet des Laboratoriums des bernischen Milchverbandes. **[Systematic Mastitis Control around Bern]**.—*Schweiz. Arch. Tierhlk.* **75.** 461-486. 1 fig., 3 tables.

A concise report, which will repay reading in the original, based upon examinations of over 11,000 cows, the incidence and course of mastitis and its control in the districts around Bern.

The earlier part of the work was done without the help of a cultural test. At a single examination about 10 per cent. of animals showed evidence of the common chronic mastitis (fibrin or increased cells, abnormal deposits, salty or obviously altered milk), but showed no streptococci microscopically nor acute symptoms, and were classed as cases of udder catarrh ; whilst 0·87 per cent. showed, in addition, the causal streptococci or acute symptoms. Over a period of two years, however, 3·7 per cent. showed streptococci or acute symptoms.

The same herds remained affected year by year, but during the period of

four years covered by the observations no general increase occurred. In three out of 13 herds reported, obvious cases of mastitis ceased to appear. In seven others with 135 cows, no less than 84 cows were severely affected within a period of two years. No association could be found with hygiene or yield. Young cows were seldom affected. Mastitis occurred most frequently towards the end of lactation. Clinical changes in the udder were found in 53 per cent. of the affected animals. About 20 per cent. of samples from infected quarters showed changes visible to the naked eye, whilst 30 per cent. showed a pus-like deposit after standing and 40 per cent. a deposit of 0·05 to 0·2 per cent. after centrifuging. Most of these had a salty taste and a high catalase figure.

The author recommends that, so long as chemotherapy and vaccination are still in the experimental stage, control should be carried out by segregation of obviously affected, infected and non-infected animals, based upon cultural methods of diagnosis. He prefers cultural methods as other methods do not detect more than half of the infected animals, and give contradictory results at successive examinations.—A. W. STABLEFORTH.

I. PILOT, I., & DAVIS, D. J. (1933). **Mucoid Encapsulated Streptococci in Sporadic and in Milk-Borne Epidemic Scarlet Fever.**—*J. Infect. Dis.* **53.** 29-37. 1 table. [12 refs.]

II. SEELEMANN, M., & HADENFELDT, A. (1933). Kapselbildende und kapsellose "pyogene" Streptokokken als Ursache von Mastitiden des Rindes. **[Capsule-Forming and Non-Capsular Pyogenic Streptococci as Cause of Bovine Mastitis].**—*Deuts. tierärztl. Wschr.* **41.** 533-534. [8 refs.]

I. Encapsulated haemolytic streptococci, resembling *Str. epidemicus* by forming mucoid colonies on ascites blood agar, were isolated from sporadic cases of scarlet fever. A strain isolated from a case of bovine mastitis also yielded such colonies and capsules. The toxins of streptococci from sporadic and epidemic scarlet fever were found to correspond to the specific toxin of the streptococcus of scarlet fever and not to the toxin of *Str. epidemicus* of septic sore throat. This implies that the scarlet fever streptococcus dissociates into a mucoid colony type which can be distinguished from *Str. epidemicus* by its toxin.

II. Streptococci with characters resembling those of *Str. pyogenes* were isolated from the udder secretion of seven cows of the same herd affected with acute mastitis. Examination of the culture recovered from the same samples of secretion on two occasions showed that capsule formation was not constant. The authors reiterate their views [this *Bull.* **3.** 658.] that capsule formation is a character which does not furnish sufficient ground for the designation of the species *Str. epidemicus*.—S. J. EDWARDS.

I. FROST, W. D., & ENGELBRECHT, Mildred A. (1933). **The Streptococci Found in Freshly Drawn Milk.**—*J. Bact.* **25.** 58-60.

II. BROWN, J. H. (1933). **The Streptococci of Milk with Special Reference to Human Health.**—*Cornell Vet.* **23.** 110-116. [22 refs.]

III. ROSENOW, E. C. (1933). **Cataphoretic Velocity and Virulence of Streptococci Isolated from Throats of Humans, from Raw Milk, Flies and Water during Epidemics of the Common Cold.**—*J. Bact.* **25.** 89.

IV. ROSENOW, E. C. (1933). **Seasonal Changes in the Cataphoretic Velocity and Virulence of Streptococci as Isolated from Well Persons, from Persons having Epidemic or Other Diseases and from Raw Milk.**—*J. Infect. Dis.* **53.** 1-11. 8 figs. [4 refs.]

I. Streptococci isolated from cows' milk fall into three main groups. The

first group is composed of β haemolytic strains which produce haemolysin in liquid media and are important to human pathology. Strains of the second group give rise to haemolytic colonies and resemble the first group in cultural and serological characters, but they do not produce haemolysin. Streptococci of the third group, which occur in milk more frequently, include the α and γ types and are similar to *Str. mitis*, *Str. fecalis* and *Str. salivarius*.

II. A concise review of the literature dealing with the streptococcus causing epidemic sore throat and its relationship to streptococci responsible for bovine mastitis. The author states that the evidence at hand indicates that milk-borne streptococcus infection in human beings is caused not by bovine streptococci, but by human strains which may become implanted into the udder of the cow. This does not frequently occur, but is sufficiently common to cause disastrous epidemics and to demand the constant vigilance of those engaged in milk control work.

III. & IV. Streptococci having the same cataphoretic velocity and virulence were isolated from the throats of persons suffering from the usual autumnal infections of the upper respiratory tract, from the raw milk and water consumed, and from flies.—S. J. Edwards.

I. Edwards, P. R. (1933). **Further Studies on the Differentiation of Human and Animal Strains of Hemolytic Streptococci.**—*J. Bact.* **25.** 527-536. 2 tables. [20 refs.]

II. Edwards, P. R. (1933). **The Diversity of Types found in Stock Cultures of** *Streptococcus epidemicus*.—*Amer. J. Hyg.* **18.** 345-353. 1 table. [18 refs.]

III. Dimock, W. W., & Edwards, P. R. (1933). **Hemolytic Streptococci of Horses and Other Animals, and Their Relation to the Streptococci of Man.** —*Kentucky Agric. Expt. Sta. Bull.* No. 338. 25-53. 4 tables. [49 refs.]

I. Haemolytic streptococci of human and animal origin could be distinguished by their action on sorbitol and trehalose. The majority of the animal strains examined fermented sorbitol, but did not produce acid from trehalose ; the human strains fermented trehalose but not sorbitol. The small group of animal strains which resembled the human cultures in fermentation reactions all reduced methylene blue under suitable conditions. *Str. equi* was differentiated by its inability to ferment these two substances as well as lactose. Sorbitol-fermenting animal strains and *Str. equi* produced capsules, a character usually attributed to *Str. epidemicus*.

II. The biochemical characters of 65 stock cultures labelled *Str. epidemicus* and collected from different laboratories were examined. Eighteen of these fermented sorbitol, indicating that they were of animal origin ; 47 strains resembled the human type. The author states that, in the light of present knowledge, there is no justification for concluding that sorbitol-fermenting haemolytic streptococci isolated from the udders of cows are of human origin or that they cause septic sore throat.

III. A perusal of this bulletin will amply repay those who are studying the streptococci because of the extent of the investigation and the conclusive results attained. With a view to attempting a final separation of the human and animal streptococci, the authors examined the biological characters of strains collected from a wide variety of sources. All the cultures were β haemolytic, produced low acidity in glucose broth, and failed to hydrolyze sodium hippurate. The results showed that five main groups with well-marked differential characters could be recognized :—(a) *Str. equi*, the specific streptococcus of strangles ; (b) a "type A" streptococcus comprising 96 per cent. of the total animal strains examined, and a

small sub-group, " type B," (c) a group made up of the human strains and (d) a group named *Str. epidemicus*, the cause of epidemic sore throat.—S. J. EDWARDS.

I. BORTHWICK, G. R. (1933). **Experimental Observations on the Toxic Effects of Staphylococcal Filtrates Introduced Enterally in Laboratory Animals.**—*Brit. J. Exp. Path.* **14.** 236-240. [6 refs.]

II. NÉLIS, P., & BOUCKAERT, J. J. (1933). Action cardiaque de la toxine staphylococcique chez le Lapin et le Chien. [**Cardiac Action of Staphylococcal Toxin on the Rabbit and the Dog**].—*C. R. Soc. Biol. Paris.* **113.** 1157-1158. [1 ref.]

III. NÉLIS, P., & PICARD, E. (1933). Contribution à l'étude de la toxine staphylococcique. Etude anatomo-pathologique des lésions aiguës provoquées par ce poison. [**Staphylococcal Toxin. Pathological Study of Acute Lesions caused by this Poison**].—*Ibid.* 1321-1323. [1 ref.]

I. Experimental methods have shown that the staphylococcal toxin responsible for food poisoning in human beings is inactivated *in vitro* when mixed with gastric content of laboratory animals which is either slightly acid (pH 6·8) or slightly alkaline (pH 7·8). When mixed with gastric content at pH 7·3 no inactivity was apparent as judged by its haemolysin and leucocidin activities.

Symptoms of poisoning could only occasionally be produced in guinea pigs and rabbits when the toxin was introduced directly into the stomach whereas, if the reaction of the stomach content was first adjusted to pH 7·3, uniformly positive results were obtained. Similar though less effective results were obtained by intrarectal inoculation of toxin after irrigation with saline and adjustment of the reaction to pH 7·3. The animals in the former experiments died within five days and *post-mortem* examination showed signs of gastro-enteritis, congestion of internal organs and haemorrhages in the stomach and kidneys.

II. Intravenous injections of large doses of staphylococcal toxin are capable of killing both rabbits and dogs in several minutes. The cause of death appears to be cardiac failure. Should a smaller dose be given then the cause of death, which occurs within several days, is a functional disturbance of other organs, e.g. the liver, kidneys, lungs and digestive tract.

III. Microscopic examination of the tissues of rabbits killed by intravenous injection of large doses of staphylococcal toxin demonstrates the lysis of red blood cells and the cells of the liver. These reactions may be the actual cause of death. Any other alterations are not constant.—R. LOVELL.

I. BACHRACH, M. D., & PACHOMOFF, V. J. (1933). Ueber die Lokalisation und Sporenbildung des B. anthracis in Häuten an Milzbrand verendeter Tiere. [**Localization and Sporulation of *B. anthracis* in Hides of Animals which have died of Anthrax**].—*Zschr. Infektkr. Haust.* **44.** 89-104. 6 figs. [13 refs.]

II. KOWANZ, R. (1933). Beitrag zum Vorkommen des Milzbrandes bei Katzen. [**The Occurrence of Anthrax in Cats**].—*Wien. tierärztl. Mschr.* **20.** 372-374. [9 refs.]

I. The problem of the disinfection of hides of animals affected with anthrax resolves itself into two questions, the rate of sporulation and the distribution of the spores in the different layers of the skin, and the procuring of a method of disinfection which is not injurious to the hide.

After giving in tabular form the statistical information concerning the mortality due to anthrax in Germany, England, Italy, France and the United States, during the various periods of this century for which records are available, and showing

the distribution amongst the different industries, the author then describes his experiments concerning the first of the above two problems.

Portions of the skins of seven cows, six horses, two guinea pigs and two rabbits, which died of anthrax, were removed after the animals had been dead at least 24 hours and stored in glass vessels at 18° to 20°C. At intervals of 1, 3, 7 and 28 days, portions were removed and sections prepared for histological examination. The bacilli were found always to be localized in the blood vessels and the greatest number were always present in the papillae of the cutis vera. They were never observed in the epidermis. Other workers have found them in this region, however, but only when oedema has occurred and it is suggested that they have then been carried through by the transudate.

Spores were observed in each layer of the skin where the bacilli occurred from the first day onwards.

II. It would appear from the literature on this subject, from which the author quotes freely, that the cat is relatively immune to infection. Details are given of a case.

A seven-year-old cat which had eaten pieces of liver from a cow slaughtered *in extremis* and found to have been suffering from traumatic pericarditis died suddenly nine hours later, showing signs of marked restlessness.

At *post-mortem* examination there was found slight degeneration of the kidneys, and mild inflammation of the small intestine. *B. anthracis* was isolated from the heart blood of the cat and from the remaining pieces of the cow's liver.

—N. S. Barron.

Weidlich, N. (1933). Ochranné očkováni glukosidovými kulturami proti sněti slezinné na Podk.Rusi v r. 1932. [**Preventive Inoculation with Glucoside Cultures against Anthrax in Ruthenia (Czechoslovakia) in 1932**].—*Zverol. Obzor.* **26.** 344-352. [6 refs.]

The vaccine injected is a solution of digitonine or saponine in physiological solution of sodium chloride to which Pasteur's anthrax vaccine II is added. The glucosides cause local necrosis of the subcutaneous tissue so that the anthrax bacilli are prevented from entering the body and the infection remains localized.

The author records very good results with this product. Out of 2,889 cattle vaccinated, three animals died in 14 days (0·103 per cent.); later, 2,883 cattle were vaccinated without any loss, whereas after vaccination by the Pasteur method, 1·6 per cent. of cattle died of typical anthrax.

To prevent heavy local reactions injection at the base of the tail is recommended.

In 1933, 20,000 cattle were vaccinated and 10,000 revaccinated with very good results.—E. Přibyl (Brno).

I. Ruiz, C., & Arroyo, C. (1933). Un estudio histopatológico de la tuberculosis muscular en la vaca. [**Histopathological Study of Muscular Tuberculosis in the Cow**].—*Trab. Inst. Biol. anim. Madrid.* **1.** 105-115. 7 figs.

II. Lozano, L. (1933). Un estudio sobre leucemia esplénica de tipo reticulo-endotelial en una vaca. [**A Study of Splenic Leucaemia of the Reticulo-Endothelial Type in a Cow**].—*Ibid.* 140-165. 10 figs. [24 refs.]

I. The histology of suspected tuberculous nodules in intermuscular tissue is described. The lesion was typical in histology, but guinea pig inoculations gave negative results.

II. A case of splenomegaly and leucaemia associated with a tuberculous lesion in a mesenteric gland is recorded. There are lengthy descriptions and discussions of histological findings.—R. S. Roberts.

HEDSTRÖM, H. (1932). Juvertuberkulos hos ko, en experimentell studie. [**Udder Tuberculosis in the Cow ; an Experimental Study**].—*Skand. Vet.-tidskr.* **22.** 628-642. 9 figs., 1 table. [Summary in English : abst. from orig.]

The writer records his observations on a case of artificially induced tuberculosis of the bovine udder. The subject was a five-year-old, newly-calved cow which exhibited no abnormality of the udder or milk. [No mention is made of the employment of the tuberculin or biological tests]. After milking on the fifth day after parturition, 15 c.c. of a 0·1 per cent. by volume suspension of living bovine tubercle bacilli were injected up the teat canal into the left hind quarter and the teat " tied off " for 20 hours, after which milking was carried out in the usual manner.

During the following six weeks, the udder was examined clinically each day. The milk was examined and the results set out as follows [from the original it appears that only the milk from the infected quarter was examined] :—

(1) The volume, which was recorded at each milking, diminished rapidly and remained low throughout the experiment.

(2) The " first milk " was examined for macroscopic changes by drawing on to a container with a black surface.

(3) The casein content was below normal within 24 hours after the injection and remained so throughout the period of observation.

(4) Sediment was calculated by centrifugation of 10 c.c. of milk ; also by a similar examination of 5 c.c. of milk which had been rendered alkaline and then mixed with 5 c.c. alcohol-ether. The latter method, which the author states to be the more exact, demonstrated that the sediment was above normal during the first six days reaching a maximum on the fourth day ; it then fell below normal for three days, afterwards rising to remain a little above normal after the tenth day except on a few occasions.

(5) Microscopical examination showed that leucocytes were invariably present together with fibrin in the majority of instances. Tubercle bacilli were observed on the 1st, 2nd, 9th, 10th, 11th, 12th, 15th, 17th, 18th, 19th, 20th, 22nd, 28th, 29th, 34th, 35th, 36th, 37th and 38th days after infection [end of observation.] Their occurrence did not necessarily coincide with variations in milk-volume or sediment. By means of a special trocar, samples of udder tissue were removed from the infected quarter two, four and six weeks after infection. The microscopic changes, depicted in three figures, are described as follows :—Two weeks after infection the mammary tissue was being replaced by young tuberculous tissue comprising many epitheloid cells with an occasional giant cell. Necrosis and desquamation of the epithelium of some tubules was taking place. Examination four weeks after infection revealed extensive round-cell infiltration with the formation of many nodules built up of epitheloid, giant and round cells. The epithelial lining of several tubules was destroyed. Six weeks after the commencement of the experiment the tuberculous nodules were partly surrounded with connective tissue and in some cases exhibited retrogressive changes. The destruction of glandular epithelium was generally complete.

On *post-mortem* examination the affected quarter felt hard to palpation ; its cut surface remained flat in contradiction to the outward bulging exhibited by normal tissue ; the quarter was studded with foci the size of a hemp-seed, light grey in colour with a golden-yellow centre. The associated lymph gland was normal to the naked eye ; microscopic examination demonstrated the presence in it of young tuberculous tissue.—G. B. BROOK.

I. WILSON, G. S. (1933). **Tuberculous Bacillaemia.**—*Med. Res. Council Gt. Britain. Spec. Rep. Ser.* No. 182. pp. 146. 5 text figs., 5 figs. on 3 plates, 19 tables. [299 refs.] [Appendices and Notes by SCHWABACHER, Herta, OKELL, C. C., & WOOD, E. A.] [2s. 6d.]

II. —. (1933). **Tuberculous Bacillaemia.**—*Lancet.* **225.** 245-246. [2 refs.]

I. A review of the literature on tuberculous bacillaemia suggests that, while it is evident that tubercle bacilli can be isolated from the blood, the investigations of many workers are unreliable. It is pointed out that errors frequently arise both in microscopic and cultural examinations through a failure to identify unequivocally the nature of acid-fast organisms which are isolated. The occurrence of various artefacts in smear preparations and the confusion which may arise through the introduction of acid-fast saprophytic bacilli in tap-water and other reagents is discussed. The attempted recognition of tubercle bacilli on morphological grounds alone is severely criticized. It is shown that the diagnosis of inoculation tuberculosis in the guinea pig on totally insufficient grounds has led to claims which can be disregarded.

The work of LÖWENSTEIN and his pupils is then compared with that of other investigators. The results, even in definite cases of tuberculosis, are extremely conflicting, ranging from 39 per cent. to 100 per cent., according to LÖWENSTEIN, down to 0·0 per cent. to 20·6 per cent. by subsequent investigators. There are similar discrepancies in the findings in certain classes of non-tuberculous cases (chorea, rheumatism, etc.) in which LÖWENSTEIN claims from 40 per cent. to 67 per cent. positive results while the corresponding figures obtained by subsequent workers do not exceed 6·7 per cent.

It is suggested that, as LÖWENSTEIN's technique calls for no particular skill, it is reasonable to conclude that the high proportion of positive results obtained by him are dependent upon an insufficiency in the criteria used in the identification of acid-fast bacilli obtained from the blood stream.

In an appendix by Schwabacher on the results of blood cultures from a series of patients, it is shown that, out of 282 tuberculous and 122 non-tuberculous subjects, clear-cut positive results were obtained in four cases only, while seven samples yielded cultures of saprophytic acid-fast bacilli. Negative results are also reported by Okell and by Wood.

II. Annotation on above.—R. E. GLOVER.

I. LOEBEL, R. O., SHORR, E., RICHARDSON, H. B., & HARRIS, Muriel. (1933). **The Influence of Foodstuffs upon the Respiratory Metabolism and Growth of Human Tubercle Bacilli.**—*J. Bact.* **26.** 139-166. 6 figs., 2 tables. [35 refs.]

II. LOEBEL, R. O., SHORR, E., RICHARDSON, H. B., & HARRIS, Muriel. (1933). **The Influence of Adverse Conditions upon the Respiratory Metabolism and Growth of Human Tubercle Bacilli.**—*Ibid.* 167-200. 3 figs., 8 tables. [45 refs.]

I. This study is part of a group of investigations carried out in co-operation with the Research Board of the National Tuberculosis Association, U.S.A. The writers point out that in any tuberculous lesion the bacilli must obtain energy for life and growth. The processes involved and their significance for the progress or arrest of a lesion can be investigated by studying, first, the metabolic characteristics of the bacteria and secondly, the environment to which they are exposed. The methods adopted in these experiments are explained. The influences of age of culture and of alterations in culture medium upon respiration, and the effects of varying concentration of glycerol, glucose, laevulose and sodium lactate are described.

The tubercle bacilli of the H37 strain used in the experiment were found to consume oxygen at a rate which is comparable to that of mammalian cells. One of the foodstuffs which caused the highest oxygen consumption was glycerol, but this could be replaced by a number of substances almost equally effective, such as sodium lactate, the sodium salts of the higher fatty acids, and diluted blood serum or caseous material, lecithin, milk and serum fat. Stimulation of respiration by glycerol was perceptible in a dilution of 0·005 per cent. and by sodium lactate in nearly as weak solution. The effect of soap was marked at 0·1 per cent. and milk fat at this dilution seemed to produce detectable stimulation. The role of the white cells in supplying the bacteria with foodstuff is suggested.

II. In this study the writers examine the environmental features which interfere with the survival and development of the tubercle bacillus, and consider the factors of " starvation," pH change, anaerobic exposure and the interaction of the cells of a tubercle with the invading organism.

The results obtained by transplanting organisms from a solution of saline and phosphate, on which they had been " starving," to flasks containing Long's fluid, are discussed. It is suggested that the power to decrease its oxygen consumption and to conserve its stored food supply may be of great value to the tubercle bacillus and may be a substitute for spore formation. In fibrotic or calcified areas it may be that deprivation of foodstuff is complete. It is known that survival in such areas is possible after many months of encapsulation, which may be due to the capacity of the tubercle bacillus to depress its oxygen consumption and live on previously stored food.

It was found that the damage done to the respiration of the tubercle bacillus was less at the alkaline extremes of the pH than on the acid side, but the failure of m/150 phosphoric or lactic acid to injure the respiration is very curious. It is considered that if penetration is necessary in order to reach the sites where respiration occurs, these must lie in the interior of the bacterial bodies. The capacity of the tubercle bacillus to form lactic acid under anaerobic conditions was examined, and the damaging effect of oxygen-lack when organisms were subsequently removed to an atmosphere of air is considered.

In response to infection with the tubercle bacillus, the body produces white cells which have been divided into two groups, monocytes and clasmatocytes. The tubercle is composed almost exclusively of monocytes and their derivatives, the epithelioid cells. Since these cells surround and, in fact, usually phagocytize the bacilli, their metabolic properties as compared with those of the parasites were studied, in order to discover if mutually harmful or beneficial relations exist. The observations indicate that in the centre of the tubercle a condition of complete oxygen-lack is reached and that in such circumstances the monocytes and bacilli have to depend upon some anaerobic mechanism for obtaining energy in order to survive. The monocytes can produce lactic acid to provide the necessary energy and might therefore survive, but, as shown by these experiments, the tubercle bacilli are unable to regain respiratory or proliferative capacity after anaerobiosis and therefore might not survive. The possibility exists, therefore, that the tubercle can bring about the cessation of growth or even the calcification of tubercle bacilli by means of this mechanism.—Ll. E. W. Bevan.

Jundell, I., & Magnusson, H. (1933). Försök rörande BCG-vaccinationens immuniserande egenskaper emot naturlig infektion inom en stor nötkreatursbesättning. [**Value of BCG against Natural Infection in a Large Herd of Cattle**].—*Svensk Vet.-tidskr.* **38.** 391-396. 1 table.

JUNDELL, I., & MAGNUSSON, H. (1933). Recherches concernant les propriétés immunisantes de la vaccination par le BCG à l'égard des infections naturelles susceptibles de se produire au milieu d'un grand troupeau de bovidés. [**Value of BCG against Natural Infection in a Large Herd of Cattle**].—*Acta path. et microbiol. scand.* Suppl. No. 16. 183-188. 1 table. [Translation of above].

An experiment on a large scale to determine the value of BCG against natural tuberculous infection in a herd of about 200 beasts, half being under two years old, was begun in 1927. In 1931 the herd had to be slaughtered on account of foot and mouth disease. Thus a rare opportunity of observing the results of BCG vaccination was available. The vaccination had been repeated annually on half the calves, an equal number being left as controls.

All calves were born in a special stall, were removed from their dams when four days old and fed till weaning on milk from a special group of ten young cows in excellent condition but not tuberculin-tested. Up to the age of between one and two years the calves were protected from all risk of infection from the older cows of the dairy herd and were only allowed access to them when two to three years old (exposure to natural infection). The incidence of open pulmonary tuberculosis in the animals over two years old averaged 5 per cent. over the three years of experiment. In 1931, 36 vaccinated and 39 non-vaccinated animals were available for *post-mortem* examination and the results are given in the table below :—

	Number of Animals.	Slight or healed T.B.	Extensive T.B.	Free from T.B.	Percentage infected.
Vaccinated	36	4	1	31	14
Not vaccinated	39	11	7	21	46

Thus it appears that BCG has a definite protective action on calves, which opinion was also held after the authors' previous experimental work on artificial infection [this *Bull.* **2.** 484].

Emphasis is laid upon the extreme difficulty of giving absolute protection to vaccinated new-born calves against exposure to infection for the first month, as CALMETTE insisted, even on the most luxurious farms.—J. E.

DAYUS, C. V., & HOPKIRK, C. S. M. (1933). **Control of Caseous Lymphadenitis in Sheep. Progress of the Flock Trials.**—*New Zealand J. Agric.* **47.** 97-98. 4 tables.

A report on the progress of flock trials of palpation of sheep and the segregation of animals found infected. The incidence of disease dropped from an average percentage of 9·34 in one flock to 3·32 on second palpation and to 1·85 on the third trial. Other flocks gave similar results.

The belief is expressed that infection not only takes place at shearing but also later by direct contact of the crowded sheep in the yards, when ruptured abscesses are brushed against cuts on clean animals.—C. S. M. HOPKIRK.

HUNTER, A. H. (1933). **Caseous Lymphadenitis : Results of Six Years' Observations.**—*Vet. Rec.* **13.** 952-953. 2 tables.

The author gives the following report of the evidence of caseous lymphadenitis in sheep bred on Patagonian and other ranches in the Argentine Republic and slaughtered at refrigerating plants between 1928 and 1933.

Cases.	Number Observed.	Average Percentage.
Lambs	2,778,755	0·578
Maiden Ewes	100,980	2·16
Hoggetts	90,260	6·04
Wethers	281,957	13·61
Ewes	493,833	26·86
Rams	3,642	20·73

Results are also given for seven individual ranches where a rising incidence with age was noted. It is thought that shearing machines transmit infection.—J. E.

I. Hernández, F. S., & Vara, G. G. (1933). Estudio clinico y profiláctico del muermo. [**Clinical Aspects and Prophylaxis of Glanders**].—*Rev. Hig. y San. pec. Madrid.* **23.** 475-505. [Summaries in English, French and Italian : abst. from orig.]

II. López, A. H. (1933). Bacteriología del muermo. [**Bacteriology of Glanders**]. —*Ibid.* 505-512. [Summaries in English, French and Italian : abst. from orig.]

I. This paper gives a general account of glanders and the authors' conclusions contain a plan for the eradication of the disease from Spain. The principles involved are sanitation, the return of animals imported from Morocco, and mallein tests supported by complement-fixation tests.

II. This paper is mainly a review, but the author records the attenuation of *B.* [*Pfeifferella*] *mallei* by cultivation in alkaline media. He advocates the provision of isolation hospitals for reactors to mallein, as it is his experience that many cases of lymphangitis not due to glanders react to mallein and are unnecessarily destroyed.—R. S. Roberts.

Rettger, L. F., Plastridge, W. N., & Cameron, Ruth. (1933). **Endemic Paratyphoid Infection in Turkeys.**—*J. Infect. Dis.* **53.** 272-279. 2 tables. [4 refs.]

Bact. aertrycke was found to be the cause of heavy losses on two turkey farms. The disease had been spread from one farm to the other, and tended to recur annually in the rearing seasons. The symptoms were very similar to those of pullorum disease, and the mortality was high, particularly in the very young poults. The pathogenicity, biochemistry and serology of the causative organism are discussed.—Norman Hole.

I. Savage, W. G. (1933). **Experimental Evidence of a Heat Resistant Gastro-Intestinal Irritant Produced by Bacilli of the Salmonella Group.**—*J. Hyg. Cambridge.* **33.** 233-244. 5 tables. [7 refs.]

II. Verder, Elizabeth, & Sutton, C. (1933). **Is Salmonella Food Poisoning caused by Living Bacilli or by Thermostable Toxic Products?**—*J. Infect. Dis.* **53.** 262-271. 1 table. [9 refs.]

I. Existing evidence is against the view that members of the salmonella group are capable of producing true exotoxins. Using a meat medium with an acid reaction, it was possible to kill a percentage of mice when fed with meat or meat juice medium in which members of the salmonella group were grown and subsequently heated for 30 minutes at 100°C. The meat dose was large and

similar results were sometimes obtained when litmus milk was used as the media. The irritant substance which the author claims to cause the death of the mice is not confined to media in which salmonella have been grown, as similar effects are obtained, though less readily, with *Bact. coli.* Experiments with kittens were negative. The type and reaction of the media appears to be the important point, as only certain batches were potent.

II. When heated or filtered cultures of *Bact. enteritidis* were fed to human volunteers or to monkeys, no symptoms of food poisoning developed. One volunteer who swallowed a culture insufficiently heated to kill the contained bacteria was severely ill, with symptoms of food poisoning. The evidence is in favour of the living bacteria, rather than any thermostable toxic products, being the cause of salmonella food poisoning. In both men and monkeys the first sign of illness was diarrhoea and cultures of the diarrhoeal stools were practically pure cultures of the swallowed organisms. The smaller the number of organisms swallowed the longer the period of incubation.—R. LOVELL.

JENSEN, C. O. (1933). Undersøgelser over "hvid Kyllingediarrhoes" ('Hønsetyfus') Udbredelse i Danmark. 4. Meddelelse 1932-33. **[Investigations into the Spread of Pullorum Disease (Fowl Typhoid) in Denmark. Fourth Report 1932-33].**—*Maanedsskr. Dyrl.* **45.** 210-218.

The decrease in pullorum disease in Denmark has continued [this *Bull.* **3.** 602]. The number of reacting birds is shown in the following table [returns from the State Serum Laboratory, Copenhagen] :—

	Number of tested birds.	Positive reaction.
1928-30 ...	131,387	5·60 per cent.
1930-31 ...	205,622	3·10 ,, ,,
1931-32 ...	240,429	2·65 ,, ,,
1932-33 ...	232,218	2·00 ,, ,,

In chickens from breeders' incubating establishments, pullorum disease was diagnosed in 65 flocks, coccidiosis in 26, round-worm infestation (*Heterakis* sp.) in two and *Mucor* mycosis in one flock. [English and American authors use the term fowl typhoid for *Bact. sanguinarium* infection, not for *Bact. pullorum* infection.—ED.]—H. LORENZEN (SØNDERBORG).

STARR, L. E. (1933). **Undulant Fever and Its Relation to Brucelliasis in Cattle and Swine in Virginia.**—*Virginia Agric. Expt. Sta. Tech. Bull.* No. 48. pp. 50. 1 fig., 14 tables. [98 refs.]

This thesis commences with a historical review of the brucelliases of human beings and animals and explains how EVANS (1918) demonstrated the intimate morphological, cultural and biochemical relationship of *Br. melitensis* and *Br. abortus.* It was therefore suspected that human infection might arise from bovine or porcine sources, as well as from goats. "For the first convincing report on the occurrence of such infections credit probably belongs to BEVAN who in 1921 observed a series of 35 cases of undulant fever in Rhodesia, associated with cattle affected with abortion disease," but where the possibility of infection from goats could be excluded. Since then undulant fever of bovine origin has been found to be widely distributed throughout the United States of America. In 1930, there was a total of 1,385 cases, every state having one or more except Utah and Nevada. The writer records 70 cases in Virginia and presents a map showing the distribution of brucella infection in cattle and swine in that state and its correspondence with the incidence of undulant fever in human beings. These cases are classified according to the age, sex and occupation of the subjects. It is interesting to note

that of these 70 cases, 15 were farmers, 6 farm housewives, 7 farm labourers, 9 city housewives and 6 students. Only one veterinarian appears in the list, but it is stated that the percentage of positively reacting sera was higher in those employed in abattoirs and among veterinarians than among other groups studied.

During the investigations some 45,285 cattle were tested of which 4,533 gave positive reactions, and on this basis it is calculated that approximately 45,000 dairy cattle in the state may be infected, and that possibly 10,000 to 20,000 are eliminating live brucella organisms in their milk. The number of cases of human infection, therefore, is relatively small. There are few goats in the state and these animals do not appear to be a factor in any of the cases studied. Of 1,316 samples of swine sera tested, 3 per cent. reacted positively, which suggests that porcine infection also is of little importance. The mortality rate from undulant fever was about 1 per cent.

This paper contains much useful and interesting information.

—Ll. E. W. Bevan.

Teichmann, R., & Mempel, S. (1933). Weitere Untersuchungen über die Bekämpfung des Abortus Bang bei Rindern im Freistaat Sachsen. [**Further Work on the Control of Contagious Abortion in Saxony**].—*Deuts. tierärztl. Wschr.* **41.** 513-517. 4 tables. [8 refs.]

Vaccination experiments on a large scale were carried out by the authors, who found that the most favourable time to inoculate living culture was 4 to 12 weeks after calving or abortion and 8 to 12 weeks before service. Following this procedure, abortion resulted in 4·1 per cent. of cows previously calving to time and in 7·4 per cent. of those which had aborted. These figures were even further reduced when dead culture was injected at the fifth month of pregnancy. There appeared to be no advantage in repeating vaccination before ensuing pregnancies.

—S. J. Edwards.

I. Butler, W. J., & Warren, D. M. (1933). **Control of Bang's Disease under Range or Semi-Range Conditions.**—*J. Amer. Vet. Med. Ass.* **82.** 309-318.

II. Munce, T. E. (1933). **Bang's Disease in Relation to Inter-State Cattle.**—*Ibid.* 318-327. [1 ref.]

I. The term " range cattle " is applied to animals which are never fed upon cut herbage while the term " semi-range " refers to cattle which are rounded up or are driven down from mountain pastures by inclement weather in the autumn. Blood testing is possible in the autumn when shipping is in progress and reactors can be disposed of immediately after the test. This method is unsatisfactory in that animals in the incubative stage remain in the herd for a year and the time of testing unfortunately follows the period at which most of the animals are served. The results of tests upon three herds are quoted to illustrate the variation in the rate of infection with *Br. abortus* under varying conditions. A test upon herd DJ (140 animals) in the autumn revealed 16 reactors and five of these were left in the herd. After one winter at home pastures the number of reactors amounted to 48. Similarly, in herd S (110 animals) an increase from 11 to 60 was noted, all the reactors having been left in the herd. In herd M (116 animals) 11 reactors were left in the herd through the summer months on free range and on testing in the autumn only ten were detected.

II. This paper is based upon information obtained by letter from sanitary officials operating in the eastern American states. Their views upon matters connected with the movement of cattle infected with *Br. abortus* are of interest because many of the eastern states, being unable to meet their own demand for

dairy cattle of breeding age, import them in large numbers from the western states. Should a western state be pursuing a policy of eradication of contagious abortion, it could, in the absence of regulations, export its reactors to an eastern state.—R. S. ROBERTS.

I. KRAMM. (1933). Das gehäufte Auftreten von Unfruchtbarkeit in Abortus-Bang-infizierten Beständen, die Art und Weise ihrer Entstehung, sowie die Möglichkeit einer wirksamen Bekämpfung. [**Common Occurrence of Sterility on** *Br. abortus* **Infected Farms**].—*Stuttgart. tierärztl. Mschr.* **4.** 75-79 and 87-92. [1 ref.]

II. HADDOW, J. R. (1933). **The Effects of Abortion and Sterility on Breeding Operations amongst Domesticated Animals in India and the Best Methods of Diagnosing and controlling these Conditions.**—*Agric. & Live-stock in India.* **3.** 325-329.

I. The author describes an investigation on a herd of 66 animals, 35 of which were sterile. Most of the non-pregnant cows had calved the previous year, some normally and some with retention of the afterbirth. [Exact numbers are not specified]. Rectal and vaginal examination of the sterile animals revealed a chronic inflammation of the os uteri, inflammation and partial or complete occlusion of the cervix, inflammation of the uterus and retention of the corpus luteum. A blood test of these animals showed that 16 cows were infected with *Br. abortus.* Treatment of sterile cows is recommended along orthodox lines.

It is considered that the brucella infection caused the sterility amongst the cows, but the author is undecided whether *Br. abortus* was the primary cause of the lesions in the genital tract, or whether it merely lowered the resistance of the individual, and so opened the path for secondary invaders. The opinions of well-known workers upon the correlation between *Br. abortus* infection and sterility are discussed.

II. In India the control of *Br. abortus* is a serious problem, as segregation of infected stock is impractical. The use of a live vaccine propagates infection and may endanger human health. Equine abortion due to *Bact. abortus equi* is also a widespread infection.—E. J. PULLINGER.

RIEDMÜLLER, L. (1933). Die Banginfektion als dispositionelles Moment für die Entstehung von Streptokokkenmastitis und Jungtiersterben. [*Br. abortus* **Infection as a Predisposing Factor to Mastitis and Diseases of the New-Born**].—*Schweiz. Arch. Tierhlk.* **75.** 301-311. 2 tables. [27 refs.]

By examining milk samples for brucella agglutinins and also for streptococci, the author was not able to find evidence to support the belief that infection of the udder with *Br. abortus* is a predisposing factor to mastitis. On the other hand, as the result of immunological and epizootiological observations, he is of the opinion that contagious abortion does predispose to *Bact. coli* infection in calves.

—S. J. EDWARDS.

I. ROLLE, M. (1933). Die Bekämpfung des ansteckenden Verkalbens durch Impfung in Lettland. [**Vaccination against Contagious Abortion in Lithuania**].—*Deuts. tierärztl. Wschr.* **41.** 707-709. 3 tables. [14 refs.]

II. CERRUTI, C. F., & CREMONA, P. (1933). Essais d'immunisation locale chez les bovidés atteints d'avortement infectieux. [**Local Immunization of Cattle against Contagious Abortion**].—*Bull. Acad. vét. France.* **6.** 335-338.

I. From his observations on over 1,000 cattle in 40 herds, Rolle concludes that contagious abortion can best be controlled by means of vaccination with a

strain of suitable virulence. The strain which he used was selected for its high agglutinogenic properties from about 30 strains which were non-pathogenic for guinea pigs and which had been isolated from herds in which the disease was mild. After four years the strain was also used on pregnant cattle without causing abortion. The vaccine was made up in 1 : 2,000 or 1 : 3,000 chinosol solution and used within one to six days, because after 10 or 12 days all the organisms were dead.

II. An attempt to confer protection against contagious abortion by placing ovules composed of gelatine and glycerine containing formolized culture in the vagina, or by injection of formolized culture into the uterus. No conclusion was reached.—A. W. STABLEFORTH.

I. STOCKMAYER, W. (1933). Die Feststellung von Bangbazillen in Einzel und Gruppenmilchproben mit Hilfe von Elektivnährböden. [**Selective Medium for the Identification of** *Br. abortus* **in Individual and Group Milk Samples**]. —*Zlb. Bakt. I.* (*Orig.*). **128.** 205-216. 5 figs., 4 tables. [13 refs.]

II. STOCKMAYER, W. (1933). Ueber die Feststellung der Bang-Bazillen in Milchproben mit Hilfe von Elektivnährböden. [**Selective Medium for the Identification of** *Br. abortus* **in Milk Samples**].—*Zlb. Bakt. I.* (*Ref.*). **109.** 238-239.

III. KARSTEN, & BISCHOFF. (1933). Weitere Untersuchungen über den Abortusnachweis mit der Milch. [**Diagnosis of** *Br. abortus* **in Milk**].—*Deuts. tierärztl. Wschr.* **41.** 593-596. [1 ref.]

IV. SCHARR. (1933). Festsetzung der Agglutinationsgrenztiter in Blut- und Milchserum von Kühen und in Blutserum von Meerschweinchen für Abortus-Bang in Markenmilch. [**Bovine Blood and Milk and Guinea Pig Blood Serological Tests for** *Br. abortus* **in Milk**].—*Ibid.* 596-597.

I. For the direct culture of *Br. abortus* from milk, liver agar containing malachite green and gentian violet, both in a concentration of 1 : 250,000, proved a suitable medium. 489 samples were examined by culturing whole milk and centrifuge deposit. By the whole milk technique 19 were found to contain *Br. abortus* and 8 per cent. of plates were unreadable owing to contamination. By the deposit method 29 were positive and 22 per cent. of plates were contaminated.

II. Refers to I above.

III. The unreliability of the whey agglutination test for *Br. abortus* contamination of milk is stressed. For direct culture from milk, 10 per cent. serum glycerine agar containing gentian violet and malachite green in concentrations of 1 : 500,000 to 1 : 200,000 is recommended. In the biological test, guinea pigs should be inoculated with a mixture of cream and deposit. Agglutinins generally appear in guinea pig sera within four weeks, but their appearance may be delayed up to 11 weeks.

IV. In mixed milk a whey agglutinin titre of 1 : 10 is suggestive of *Br. abortus* contamination. In cattle blood an agglutinin titre of 1 : 100 and in guinea pigs a titre of 1 : 40 is evidence of infection.—E. J. PULLINGER.

I. RAINSFORD, S. G. (1933). **The Susceptibility of Laboratory Animals to Experimental Infection with Brucella.**—*Irish J. Med. Sci.* April. 150-163. 3 tables. [3 refs.]

II. VALLA, G. (1933). Sulla recettività del gatto alle brucellosi. [**Susceptibility of Cats to Brucellosis**].—*Nuova Vet.* **11.** No. 11. 18-20. [1 ref.]

I. Owing to the frequently reported failure by earlier workers to infect the usual laboratory animals with brucella, the author has used an animal recently introduced into laboratory practice. This is the Aleppo hamster (*Cricetus auratus*).

These animals showed themselves extremely susceptible to intraperitoneal injections of brucella.

In the guinea pig, the lesions produced by *Br. abortus* (bovine strain) are localized and develop rapidly, in contrast to the more widely spread, small miliary lesions in animals inoculated with *Br. abortus* (porcine strain) and *Br. melitensis*.

II. In order to determine whether *Br. abortus* infection could take place by ingestion, cats were given 48-hour cultures in milk and pieces of infected placenta. The experimental animals received several doses of infected material over a period of one month, but in no case did clinical examinations or agglutination tests show that infection had taken place; moreover, the *post-mortem* findings were always negative.—J. A. NICHOLSON.

OLITZKI, L., & GUREVITCH, J. (1933). Ueber die serologischen Typen der Brucellagruppe und ihre Variationsmöglichkeiten. [**On the Serological Types of the Brucella Group and their Variations**].—*Zlb. Bakt. I. (Orig.).* **128.** 112-124. 9 tables. [23 refs.]

In view of the difference of opinion which has been expressed regarding the possibility of differentiation within the brucella group on serological grounds, the authors have studied four naturally occurring strains, two *Br. melitensis* and two *Br. abortus*, and their ability to produce variants.

From observations on these four strains they conclude that, in the first place, all strains of brucella possess a common antigen G; and that, in addition to this, strains of *Br. melitensis* are characterized by a specific antigen M, and strains of *Br. abortus* by another specific antigen A. The antigens of *Br. melitensis* and *Br. abortus* are therefore designated, MG and AG, respectively. A strain of brucella isolated by GILBERT from a bovine, *Br. abortus*, Jaffa, showed yet another specific antigen, called P, and also the antigen M. It is therefore characterized as P(M)G.

A gradual loss of agglutinability by specific sera occurred during passage in homologous and heterologous immune sera. Passage in a semi-solid medium, consisting of glycerin-phosphate-cystine broth, "with an agar addition in the proportions 1 : 9," usually resulted in a return to the original specifically agglutinable form. In no case was a change from one specific type to another produced by cultivation of the G form of one species in a medium containing serum and killed culture of another species. Owing to the large number of intermediate forms which occur between the complete MG or AG forms and the entirely non-specific G forms, the authors believe that the characters of brucella strains cannot be suitably stated in terms of S and R, but that attention should be paid separately to their agglutinability, binding power and antibody-producing power.

—A. W. STABLEFORTH.

PERES, M. (1933). Rapport d'ensemble sur la mélitococcie présenté à la suite de la conférence tenue par les Services vétérinaires à Avignon, les 25-26 Novembre 1932. [**Combined Report on Undulant Fever presented at the End of the Conference held by the Veterinary Services at Avignon, November 25th-26th, 1932**].—*Bull. Soc. Sci. vét. Lyon.* **36.** 15-33.

The author has correlated the evidence on this subject, more especially with regard to sheep and goats. An account of the epidemiology and aetiology is followed by a description of the allergic diagnosis introduced by DUBOIS and SOLLIER. These authors have shown that the intradermal inoculation of a killed *Br. abortus* antigen is a reliable method of diagnosis in sheep and goats and is more practicable and more accurate than the agglutination test. Results recorded to date appear to have been highly satisfactory. From the immunological aspect,

killed *Br. abortus* inoculations have yielded hopeful results. In human beings safe protection is obtained from three subcutaneous injections, at 8 to 10-day intervals, of a killed vaccine containing human, ovine and caprine strains of *Br. melitensis* and bovine and porcine strains of *Br. abortus*.—NORMAN HOLE.

—. (1933). **Undulant Fever.**—*New Zealand Med. J.* **32.** 187-196.

The question of undulant fever was discussed by the Pathological and Bacteriological Society of New Zealand at a meeting held on November 30th, 1932. The veterinary viewpoint was put before the medical fraternity by C. S. M. HOPKIRK, in charge of veterinary research work of the Department of Agriculture. Attention was drawn to an epidemiological survey of the disease in New Zealand carried out by F. S. MACLEAN of the Health Department. He showed that 58 per cent. of the known cases were found in the dairy population.

Contagious abortion in New Zealand in livestock was shown to be prevalent, the average positive agglutination reactions in herds being 33 per cent. Of 632 composite samples of milk from herds tested by guinea pig inoculation, 36 per cent. of guinea pigs gave a positive agglutination reaction, but only 2 per cent. of such milks gave a growth on culture. It was pointed out that the porcine strain of *Br. abortus* did not exist in New Zealand as far as was known, so that all undulant fever cases were of bovine origin. Vaccination of herds had been carried out with dead vaccine made by various means and this method had proved unsuccessful. Live vaccine was not used. A number of herds were, however, being kept free by agglutination tests of the blood of the cows.

Various members of the association described individual cases of the disease and a general discussion occurred on the clinical details noted by various members. An important point noted by GILMOUR was the tubercle-like nodule frequently observed in guinea pigs after injection with *Br. abortus* infected material.

—C. S. M. HOPKIRK.

MANSON-BAHR, P. H. (1933). **The Increased Frequency of Fevers of the Undulant Type in Non-Tropical Countries, and its Relationship to Infection by Cow's Milk.**—*Trans. Med. Soc. London.* **56.** 192-209. [8 refs.]

In this paper, read before the Medical Society of London in February, 1933, Manson-Bahr presented a very comprehensive review of the present knowledge of the fevers of the undulant type and their relationship to infection by cows' milk. He emphasized the desirability of some more descriptive and generally acceptable term than " *abortus* fever " now so frequently applied. He suggested the term " undulant fever of *abortus* type " as more appropriate. He dealt very fully with the history of the discovery of the association between *Br. abortus* infection in cattle and undulant fever in human beings. He states that, in 1922, BEVAN in Rhodesia suggested that a type of undulant fever, which had in recent years become prevalent in that country, was caused by *Br. abortus*, basing his opinion upon the fact that cases occurred where no goats were kept but where abortion was prevalent in the cattle. In 1924, DUNCAN at the Hospital for Tropical Diseases in London isolated an organism of *abortus* type from the blood of a Rhodesian case. From that date cases of undulant fever of *abortus* type have been recognized in most parts of Europe and in the United States of America. Indeed, DALRYMPLE-CHAMPNEYS states that the discovery of cases is taking place with such frequency that there is hardly a civilized country from which it has not been reported.

—LL. E. W. BEVAN.

FREIXAS, P. M. (1933). El carbunco sintomático del cerdo. **[Blackleg in Swine].** —*Rev. Hig. y San. pec. Madrid.* **23.** 143-145. B

The author made bacteriological examinations of two pigs, which, together with several others, had died after a brief illness. *Clostridium chauvoei* was isolated and identified by observation of the lesions produced in guinea pigs. Vaccination of the herd against blackleg appeared to yield entirely satisfactory results.

—R. S. Roberts.

I. Livesay, H. R. (1933). **Dissociation of Clostridium Welchii.**—*J. Infect. Dis.* **53.** 125-137. 4 figs. [7 refs.]

II. Orr, J. H., & Reed, G. B. (1933). **Variation in** *Cl. welchii.*—*J. Bact.* **25.** 96-97. [Paper read at 34th Ann. Meet. Soc. American Bacteriologists].

III. Hoyt, A. (1933). **A Rapid Method for the Identification of Clostridium welchii.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 875-876. [1 ref.]

I. Three cultures of *Cl. welchii* were first studied to determine their normal characteristics and were then further observed over a period of many weeks for the detection of morphological changes and changes in colony formation, in fermentation reaction and in pathogenicity. When subjected to prolonged incubation, on the surface of a modified agar medium, *Cl. welchii* produced rough colonies which were made up of encapsulated rods arranged in chains or filaments. In addition, pigmented subsurface rootlets were formed which burrowed into the underlying media. *Cl. welchii* also produced variants in shake tubes. The author describes in detail the colony formation of these variants. Photographs of some of the actual variants produced are in the text.

No avirulent strains of *Cl. welchii* were recovered from a formerly virulent strain by the methods used in this work.

II. When cultures of *Cl. welchii* were plated out on suitable media, two distinctly different types of colonies were produced which were designated S and R. These two types gave the characteristic reactions of *Cl. welchii.* In liquid media the S produced an even turbidity while the R sedimented to the base of the tube with an almost clear supernatant fluid. Cataphoresis and agglutination studies indicated the presence of two distinct types. The S was pathogenic for pigeons and rabbits, producing an active haemotoxin, while the R was less pathogenic and a weak producer of haemolysin.

III. If a mouse is injected intravenously with a culture of *Cl. welchii*, killed within a few minutes, and incubated for six hours at 37°C., a very typical macroscopic and microscopic picture is presented on autopsy. A similar appearance is obtained if a mixed culture is treated in the same manner. This method has been used successfully by the author on 35 occasions and he suggests that it would be a useful method for early diagnosis of the presence of *Cl. welchii* in suspected cases.

—A. J. Wilsdon.

I. Tunnicliff, E. A. (1933). **A Strain of Clostridium welchii producing Fatal Dysentery in Lambs.**—*J. Infect. Dis.* **52.** 407-412. 2 tables. [5 refs.]

II. Mason, J. H. (1933). **B. Welchii, The "Lamb Dysentery Bacillus," and B. Paludis. An Examination of Single-Cell Cultures.**—*Vet. J.* **89.** 225-231. 3 tables. [9 refs.]

III. Glenny, A. T., Barr, Mollie, Llewellyn-Jones, Mona, Dalling, T., & Ross, Helen E. (1933). **Multiple Toxins produced by Some Organisms of the** *Cl. welchii* **Group.**—*J. Path. & Bact.* **37.** 53-74. 8 tables, 5 charts. [10 refs.]

I. This paper describes an unusual peracute and fatal form of diarrhoea in lambs in Montana. Newly-born lambs develop diarrhoea within a few hours of birth, this being rapidly followed by prostration and death.

Bacteriological examination revealed the intestinal flora to be normal except that the strain of *Cl. welchii* recovered was extremely toxic. Healthy lambs fed either with intestinal contents from dysenteric lambs or with cultures of *Cl. welchii* isolated from fatal cases developed the typical syndrome followed by death.

A comparison of the cultural properties of this organism with DALLING'S " lamb dysentery bacillus " showed them to be different strains.

II. In this article the author discusses the morphological, cultural and toxico-serological properties of the original and single-cell cultures of the " lamb dysentery bacillus " isolated by DALLING (1923), *Cl. paludis*, isolated by MCEWEN (1930) and *Cl. welchii* (National Collection of Type Cultures Strain S.R. 12).

The article does not lend itself to abstraction and should be consulted in its original form by those interested. For the benefit of the general reader, the following is an extract of the author's summary :—

" Morphologically these germs cannot be distinguished one from the other. The only cultural difference is the fermentation of glycerine by *B. paludis* and *B. welchii*, and the failure to do so by the lamb dysentery bacillus. No strain liquefied inspissated horse serum, and all clotted alkaline egg medium. The reactions in these media do not distinguish the one germ from the other. The antitoxins of the lamb dysentery bacillus and *B. paludis* (both original and single-cell cultures) neutralize the toxin of *B. welchii*. *B. welchii* antitoxin does not neutralize the toxins of these anaerobes. Serologically the chief fraction of the toxins of the lamb dysentery bacillus and *B. paludis* (both original and single-cell cultures) is identical."

III. By using different methods of titration against many different batches of serum, the authors have demonstrated that *Cl. paludis* and lamb dysentery culture filtrates consist of at least four toxins, for each of which a specific antitoxin can be produced. These toxins are :—

(1) α toxin—the toxin of classical *Cl. welchii* which is present in lamb dysentery and to a slightly greater extent in *Cl. paludis* filtrates.

(2) β toxin—a necrotic non-haemolytic toxin, the predominant constituent of lamb dysentery and *Cl. paludis* filtrates.

(3) γ toxin—present in lamb dysentery filtrates, and probably also to a slight extent in *Cl. paludis* filtrates.

(4) δ toxin—a haemolysin produced by *Cl. paludis* and probably also to a smaller extent by the " lamb dysentery bacillus."—GWILYM O. DAVIES.

RUIZ MARTÍNEZ, C. (1933). Estudio de las lesiones anatómicas e histológicas en dos casos de actinomicosis de mama de cerdo. [**Study of the Anatomical and Histological Lesions in Two Cases of Actinomycosis of the Udder in the Sow**].—*Rev. Hig. y San. pec. Madrid.* **23.** 139-143. 4 figs.

The lesions appeared to have arisen from multiple foci, all of which had become included in a connective tissue capsule. Outside the capsule the gland epithelium was compressed and close to the capsule had proliferated so as to occlude the lumen of the ducts. Inside the capsule the tissue was subdivided by trabeculae from the capsule. Leucocytes were abundant but typical actinomyces were rare, most of the parasites undergoing phagocytosis. The blood supply inside the capsule appeared to be derived from ruptured capillaries in the connective tissue.—R. S. ROBERTS.

DISEASES CAUSED BY PROTOZOAN PARASITES.

REGENDANZ, P., & REICHENOW, E. (1933). Die Entwicklung von *Babesia canis* in *Dermacentor reticulatus*. [**The Development of** *Babesia canis* **in** *Dermacentor reticulatus*].—*Arch. Protistenk.* **79.** 50-71. 1 text fig., 42 figs. on 2 plates. [15 refs.]

Only a small number of the blood organisms are said to survive in the intestine of the tick and these surviving organisms assume a worm-like form and penetrate the intestinal epithelium, where they grow and multiply. No evidence of any sexual differentiation or any conjugation was detected. Later, the organisms assume a large worm form, penetrate the body cavity, enter the ovary and invade the eggs where they again multiply by binary fission and become much reduced in size. No further development was detected until the ticks, in the nymph stage, commenced to feed. Then parasites, already present in the salivary glands, commence to divide rapidly and produce masses of small individuals which are emptied into the salivary alveoli and injected into the dog with the salivary secretion.

In the dog no development occurred except for simple division of individuals into two. In the absence of a sexual cycle and any form of sporogony, the authors suggest that the *Babesia* cannot be classified as sporozoa, but must be placed in the rhizopoda. They suggest that the sporonts and sporoblasts which have been described by other authors in the life cycles of *B. bigemina* and *Theileria parva* may be symbionts of the ticks or degenerate forms of the piroplasms.

—U. F. Richardson.

Wilson, I. D., & Morley, L. C. (1933). **A Study of Bovine Coccidiosis, II.**—*J. Amer. Vet. Med. Ass.* **82.** 826-850. 2 tables. [9 refs.]

The first part of the paper is devoted to the literature, technique and origin of the material used. This is followed by accounts of infection experiments in which individual calves were fed with varying quantities of mixed or pure cultures of oocysts of bovine origin, the subsequent infection being studied or the resistance of the animals tested with a further dose of infective material. These experiments were uncontrolled and, as the production of infection in calves was shown to be uncertain, the conclusions drawn from them do not appear to be in proportion to the evidence obtained. The latter part of the paper is mainly devoted to a study of the oocysts of *Eimeria zurni*, *E. smithi* and *E. cylindrica* and to the symptoms and pathology of bovine coccidiosis.

The more important conclusions drawn are :—that natural resistance varies ; that an attack of the disease confers an immunity which lasts for at least five months ; that there is no correlation between the amount of infective material ingested and the subsequent attack ; that there is probably a predisposing factor. Oocysts were found to be highly resistant to the effects of low temperatures and were not digested when fed to rats ; they were rapidly destroyed by sunlight, drying and putrefaction ; the sporulation times were three to five days for *E. smithi*, two to three days for *E. zurni* and one to two days for *E. cylindrica*.—R. S. Roberts.

I. Oehme. (1933). Beitrag zur Kokzidiose des Hundes. **[Coccidiosis of Dogs].** —*Tierarztl. Rdsch.* **39.** 462-464. [17 refs.]

II. Schmidt, J. (1933). Zur pathologischen Anatomie der Kokzidiose des Hundes. **[Pathologic Anatomy of Coccidiosis in Dogs].**—*Ibid.* 464-465.

III. Gousseff, W. F. (1933). Zur Frage der Katzenkokzidiose in Transkaukasien. **[Coccidiosis of Cats in Transcaucasia].**—*Deuts. tierärztl. Wschr.* **41.** 694-695. 6 figs. [22 refs.]

IV. Yakimoff, W. P. (1933). Sur la question des coccidies des animaux vivant en liberté. Première communication. **[Coccidia of Wild Animals. Part I.].** —*Bull. Soc. Path. exot.* **26.** 1192-1199. 2 tables.

I. & II. Oehme describes the symptoms and *post-mortem* lesions of two cases of coccidiosis in dogs. Although the condition is rare, it is stressed that it should not be overlooked in differential diagnosis when symptoms of acute diarrhoea are

present. According to Schmidt, the lesions of coccidiosis in the dogs are generally confined to the terminal part of the small intestine.

III. From the faeces of a wild cat the author isolated coccidia of the species *Eimeria* similar to *Eimeria cati* described by YAKIMOFF [this *Bull.* **2.** 546].

IV. The author made a study of the various species of coccidia occurring in the faeces of domestic and wild ruminants. He found that all the commonly described varieties infected these animals and that only the gazelle and the wild mountain sheep harboured specific coccidia.—S. J. EDWARDS.

KOTLÁN, A. (1933). Zur Kenntnis der Kokzidiose des Wassergeflügels. Die Kokzidiose der Hausgans. **[Our Knowledge of Coccidiosis in Water Birds. Coccidiosis of the Domestic Goose].**—*Zlb. Bakt. I.* (*Orig.*). **129.** 11-21. 3 text figs., 20 figs. on 1 plate. [12 refs.]

PATTERSON, F. D. (1933). **Cross Infection Experiments with Coccidia of Birds.**—*Cornell Vet.* **23.** 249-253. 4 tables. [8 refs.]

The first article gives a description of the following four coccidia of the domestic goose :—

Eimeria parvula :—The oocyst is round or slightly oval, 10μ to 15μ long by 10μ to 14μ broad, without a micropyle. The organism infects the lower part of the small intestine and appears to have little pathogenic importance.

E. anseris :—The oocyst is pear-shaped, 16μ to 23μ long by 13μ to 18μ broad, and possesses a micropyle. This organism is also found in the lower part of the small intestine.

E. nocens :—The oocysts are elliptical, with one end rounded and the other truncated. They resemble the oocyst of *E. truncata* except that the polar cap is absent. The organisms are found in the lower part of the small intestine round the base of the villi.

Both *E. anseris* and *E. nocens* are most commonly encountered in young geese and they are associated with alteration of the intestine and destruction of epithelial cells.

E. truncata :—The oocysts resemble those of *E. nocens* except that the truncated end exhibits a polar cap. The organism infects the kidneys and opinions differ as to whether it also infects the intestine. It is a common parasite of young geese and can, apparently, cause disease, but heavy infection may be encountered without any disease symptoms.

The second article records experiments on cross-infection of fowls, turkeys, ducks, pheasants and quail with coccidia.

E. tenella failed to infect turkeys, ducks, pheasants or quails ; *E. mitis*, *E. acervulina* and *E. maxima* failed to infect quails ; *E. phasoni* and *E. dispersa* failed to infect fowls.—U. F. RICHARDSON.

DUKE, H. L. (1933). **Studies on the Factors that may influence the Transmission of Polymorphic Trypanosomes by Tsetse. IV. On the Spontaneous Disappearance of Flagellates from an Infected Glossina. V. On the Effects of Temperature. VI. On the Duration of the Biological Cycle in Glossina.** —*Ann. Trop. Med. & Parasitol.* **27.** 431-435, 437-450 and 451-467. 4 tables. [19 refs.]

IV. Records the detection of a laboratory bred *G. palpalis* in which no gut infection with flagellates could be demonstrated, and in which the gland flagellates were motionless and apparently dead ; so that, had the fly lived, the flagellate infection would, presumably, have disappeared.

V. This article records experiments indicating that an incubator temperature

of 86° to 88°F. favoured the development of *Tryp. gambiense* in *G. palpalis*, and a temperature of 96° to 98°F. even more so. In no instance did incubation at 96° to 98°F. enable a non-transmissible strain of *T. gambiense* to develop in the tsetse. The author suggests that the higher temperature reduces the inhibitory action of the fly's tissues.

VI. This article discusses the records of the length of the periods which elapse between the infecting feeds of tsetse fly and gland infection and concludes that the biological cycle rarely exceeds 30 days. Flies may have a flagellate infection of the gut for five to seven weeks without becoming infective, and it appears that there are a certain number of infected flies in which trypanosomes never reach the glands. It cannot, therefore, be assumed that every fly with an infected proventriculus will, if it lives long enough, eventually develop a gland infection.

—U. F. Richardson.

Lenfeld, J. (1933). Contribution au diagnostic clinique de la leishmaniose canine spontanée. [**The Clinical Diagnosis of Spontaneous Canine Leishmaniasis**].—*Rev. gén. Méd. vét.* **42.** 1-11.

Nattan-Larrier, L., & Grimard-Richard, L. (1933). Une méthode de diagnostic de la leishmaniose viscérale. [**A Method of Diagnosis for Visceral Leishmaniasis**].—*C. R. Soc. Biol. Paris.* **113.** 1489-1492. [1 ref.]

The first article describes the symptoms seen in dogs suffering from naturally contracted leishmaniasis in Tashkent and China. The main symptoms recorded are emaciation, chronic conjunctivitis, sunken eyes, ectropion of the lower eyelid and loss of hair from the head and neck. Chronic ulcers covered with pus and the scars of healed ulcers were found on the ear of one dog. The skin form of the disease unassociated with other infection is rare. The author suggests that animals in which leishmania are discovered in the absence of symptoms represent recoveries.

The second article records good results in the use of the absorption of the complement test in the diagnosis of visceral leishmaniasis. The sera to be tested were mixed with the serum of a rabbit which had been inoculated with *Leishmania donovani*. Six clinically infected dogs were tested and their sera, diluted to 1 : 100,000,000, prevented haemolysis. The reaction was also given by the serum of a child suffering from visceral leishmaniasis and also by the sera of two mice infected by *L. tropica*, and is thus a group reaction.—U. F. Richardson.

I. Franco, E. E. (1933). Le leishmaniosi in Sardegna. [**Leishmaniasis in Sardinia**].—*1er. Congrès internat. Hyg. méditerranéenne, 1932.* **1.** 277-303. 2 figs. [29 refs.]

II. Franchini, J. (1933). Leishmanioses dans les colonies italiennes de l'Afrique du nord. [**Leishmaniasis in the Italian Colonies of North Africa**]. —*Ibid.* 304-307.

III. Behdjet, H. (1933). Leishmaniose cutanée ou bouton d'orient. [**Cutaneous Leishmaniasis or Oriental Sore**].—*Ibid.* 313-336. 4 figs.

IV. Giraud, P. (1933). Le kala-azar dans la région marseillaise. [**Kala Azar in the Marseilles District**].—*Ibid.* 361-366.

V. Giraud, P., & Cabassu, H. (1933). Sur la présence de parasites dans les lésions cutanéo-muqueuses des chiens atteints de leishmaniose spontanée. [**The Presence of Parasites in the Cutano-Mucous Lesions of Dogs affected with Spontaneous Leishmaniasis**].—*Ibid.* 367-372.

I. Discusses the incidence of human leishmaniasis in Sardinia, where 31 cases have been recorded since 1920. Canine leishmaniasis was first detected in 1917 and recently, on examination of 200 dogs from various provinces, 13 cases

of leishmaniasis were detected. The human disease is most prevalent in shepherds and it has been supposed that this is due to their close association with dogs. The author suggests that other animals may act as the reservoir, and points out that the nomadic life of the shepherds and their sleeping in wayside huts may expose them to infection which may be conveyed by a nocturnal insect.

II. This article describes the incidence of human leishmaniasis in Tripoli, where 30 cases of cutaneous leishmaniasis and five cases of kala azar have been recorded. On examination of 117 dogs, two were found to be affected.

III. Gives a general survey of the knowledge of oriental sore and discusses the disease as it occurs in Turkey. The view is expressed that infection is spread from man to man probably by *Phlebotomus papatasii*. Except for areas near the Syrian frontier, dogs are free from the disease.

IV. Discusses the incidence of human leishmaniasis in Marseilles and the increase of cases which has occurred in recent years. The distribution of the disease in dogs corresponds somewhat with the human disease in that dogs living on the outskirts of the town are most commonly affected. Dogs living in apartments in the centre of the town are, however, also attacked.

V. Three forms of cutano-mucous leishmaniasis of the dog are described—ulceration of the mucous membranes, ulceration of the skin and furfuraceous dermatitis. For diagnosis, scraping of the ulcers is preferred to other methods. In the furfuraceous type, the skin should be incised to the deeper layers and the serous exudate examined. This can often be done conveniently by cutting the skin of the edge of an affected ear.—U. F. RICHARDSON.

RIEDMÜLLER, L. (1933). Experimenteller Abortus beim Rind, verursacht durch vaginale Uebertragung von Trichomonaden. **[Experimental Abortion in Cattle produced by Vaginal Transmission of Trichomonads].**—*Schweiz. Arch. Tierhlk.* **75.** 457-461. [8 refs.]

This article records attempts to ascertain the pathogenicity of uterine trichomonads of cattle by intravaginal inoculation into cattle of pure cultures of the trichomonads from artificial media or from guinea pigs. Non-pregnant cattle developed a vaginitis, and trichomonads could be detected for variable periods in the vagina, but not in the uterus.

A pregnant cow, inoculated intravaginally with a culture of trichomonads, aborted after 25 days. Trichomonads were detected in the foetus and in the amniotic fluid. Cultures from the foetus were negative as regards bacteria and the cow was negative to *Br. abortus* infection by both biological and agglutination tests. On autopsy, trichomonads were found in the left horn of the uterus, but not in the right horn which had carried the calf.—U. F. RICHARDSON.

DISEASES CAUSED BY VIRUSES.

GILTNER, L. T., & SHAHAN, M. S. (1933). **The Immunological Relationship of Eastern and Western Strains of Equine Encephalomyelitis Virus.**—*Science.* **78.** 587-588. [2 refs.]

GILTNER, L. T., & SHAHAN, M. S. (1933). **The 1933 Outbreak of Infectious Equine Encephalomyelitis in the Eastern States.**—*North Amer. Vet.* **14.** No. 11. 25-27. 1 table. [2 refs.]

The authors report a serious outbreak of equine encephalomyelitis in Virginia, Maryland and Delaware ; the maximum was reached in August. The disease

attacked nearly one-third of the horses and mules and had a mortality rate of 90 per cent.

The only difference between the disease in the eastern and western states was that in the former it was much more acute and cross-immunity tests with potent western antiserum and eastern virus showed that eastern and western viruses are distinct [like the separate foot and mouth disease strains]. The writers isolated eight strains from the eastern outbreaks.—J. E.

I. SARNOWIEC, W. (1933). Nouveaux essais d'immunisation contre la peste porcine. [**Immunization against Swine Fever**].—*C. R. Soc. Biol. Paris.* **114**. 612-613. [2 refs.]

II. SARNOWIEC, W. (1933). Recherches sur les variations sanguines chez les Porcs atteints de peste, de paratyphoide, de pasteurellose et de pyobacillose. [**Inquiry into the Blood Cell Counts of Pigs affected with Swine Fever, Paratyphoid Infection, Pasteurellosis and Pyobacillosis**].—*Ibid.* 613-615. [4 refs.]

I. Sarnowiec attempted the immunization of pigs against swine fever by means of a formolized virus (2 to 10 per 1,000) suspended in equal parts of castor oil. The spleen, liver, kidneys and lymphatic glands of pigs killed in the acute stage of the disease were pulped, formalin was added and the mixture was left in the incubator at 37·5°C. for 14 to 28 days ; the castor oil was then added. In an experiment on 12 pigs to which 10 c.c. to 50 c.c. doses were given, the vaccine conferred no protection.

In a second experiment a thicker vaccine was used, and in addition another vaccine consisting of formolized virulent blood—tapioca being added to both vaccines in the proportion of 1 : 100. There was no evidence that these vaccines conferred any immunity.

II. The author examined the blood of 28 pigs naturally infected and 30 pigs artificially infected with swine fever and found that a leucopenia was present.

No abnormal variation occurred in the number of red blood cells in any of the diseases mentioned. In view of the fact that there is wide variation in the white cell count, Sarnowiec believes that this method has no diagnostic value for the infections studied.—T. M. DOYLE.

I. VAN SACEGHEM, R. (1933). Action du sérum et nature du vaccin utilisés contre la peste bovine. [**Action of the Serum and Nature of the Vaccine used against Rinderpest**].—*Bull. Soc. Path. exot.* **26.** 715-720. [12 refs.]

II. VAN SACEGHEM, R. (1933). La pulpe du tissu testiculaire dans la préparation du vaccin contre la peste bovine. [**Formolized Testicular Tissue as a Vaccine against Rinderpest**].—*C. R. Soc. Biol. Paris.* **113.** 1539-1540. [1 ref.]

I. van Saceghem claims that an antirinderpest serum, endowed with curative properties, can be prepared. To obtain such a serum it is essential to hyper-immunize the animals not only with virulent blood but also with injections of organ pulp, including spleen and lymphatic glands, to which tissue the rinderpest toxin is fixed. A serum may in this way be prepared that is both antiviral as well as antitoxic.

II. The author records that formolized testicular tissue provides a satisfactory vaccine against rinderpest. Brain tissue prepared on the same lines was apparently of no value.—T. M. DOYLE.

I. ALANO, S. (1933). **Rinderpest Control in the Field.**—*Gaz. Bureau Anim. Indust. Philippine Is.* **3.** 109-111.

II. SANCHEZ, L. (1933). **Practical Method of Using the Single Injection Wet Anti-Rinderpest Vaccine in the Field.**—*Ibid.* 221-222.

III. D'COSTA, J., & SINGH, B. (1933). **The Duration of Immunity in Calves Inoculated by the Bull Virus *cum* Serum Method against Rinderpest.**—*Ind. J. Vet. Sci. & Anim. Husb.* **3.** 131-148. 4 tables. [9 refs.]

I. This article gives a history of the methods used in the control of rinderpest in the Philippines. At first, reliance was placed upon stringent quarantine measures, all infected animals being placed in a "corral." This practically paralysed all work in the area until the restrictions could be removed. Next, slaughter of infected animals was tried, but the psychological effect was disastrous owing to the fondness of owners for their animals. Later, the serum-simultaneous inoculation method was employed, but this proved too cumbersome owing to the necessity of using a dose of 300 to 500 c.c. of serum. Vaccine was introduced in 1923, and this method has now been improved to such an extent that one dose of 3 c.c. to 6 c.c. is sufficient to give prolonged immunity.

II. This article suggests a method of working whereby the staff required for vaccinating cattle against rinderpest could be reduced. The main idea is that, as the dose of vaccine has been reduced to 3 c.c., it would be possible to fill several syringes so as to have a large number of doses ready for inoculating before actually commencing work.

III. This article records investigations into the immunity conferred on 98 calves varying in age from ten days to two years by the serum-simultaneous method of immunization. Thirty-one calves definitely reacted to the inoculation and proved immune on testing up to four years. Fifty-three calves gave no reaction to the inoculation and no reaction to the test. Fourteen calves reacted to the test. The varying ages of the animals and the varying intervals before testing makes a summary difficult and the article should be consulted in the original.

—U. F. RICHARDSON.

I. NICOLLE, C., & BALOZET, L. (1933). Absence de pouvoir pathogène pour l'homme des virus aphteux des types connus. [**Absence of Pathogenic Power for Man in Known Types of Foot and Mouth Virus**].—*Arch. Inst. Pasteur Tunis.* **22.** 193-197. [5 refs.]

II. LINON, G. (1933). Essais d'hémoprévention de la fièvre aphteuse. [**Prevention of Foot and Mouth Disease by the Inoculation of Convalescent Blood**].—*Rev. vét. et J. Méd. vét.* **85.** 434-439. [1 ref.]

I. The authors have tested the pathogenicity of the three known strains of foot and mouth virus (guinea pig material) for human beings. They inoculated three persons with each strain, one in the palm of the hand and sole of the foot, one in the mucous membrane of the cheek and the gum, and one intramuscularly in the thigh. No reaction, either local or general, resulted and blood taken at 24, 48 and 72 hours proved non-infective for guinea pigs and swine. No local outbreak of foot and mouth disease followed these inoculations.

II. The author recommends the use of citrated blood, drawn from the jugular vein 14 to 20 days after vesicles have appeared, as a preventive inoculation in foot and mouth disease. He reports on such treatment of 815 animals of the bovine, ovine or porcine species, giving when possible 1 c.c. of blood per kg. live body weight. 194 were not exposed to direct infection and remained healthy. Of the remainder, directly exposed, none died, 371 remained healthy, 79 became infected less than 15 days after inoculation and 171 became infected more than 15 days later. He claims, for this method, that the treatment is innocuous, 60 per cent.

efficacious and cheap (about Fr. 7.35 per head). Careful choice of donors and mixing of bloods is indicated.—NORMAN HOLE.

LIGNIÈRES, J. (1933). La exportación de las carnes y la influencia que pueden tener la fiebre aftosa sobre la misma. [**Meat Exportation and the Possible Influence upon it of Foot and Mouth Disease**].—*Rev. zootéc.* **20.** 97-102.

The author discusses the possible markets for Argentine frozen beef in France and the United States. In the case of France he suggests that markets might be obtained by an agreement for a reduction of tariffs on beef from animals bred from French bulls. As regards the United States he is of opinion that markets will only be obtained when the foot and mouth disease problem in the Argentine is overcome. He discusses a campaign of vaccination.—R. S. ROBERTS.

—. (1933). Resultado de los experimentos realizados en el Laboratorio del Ministerio de Agricultura de Francia, con la vacuna contra la fiebre aftosa, del Professor José Lignières. Conclusiones oficiales firmadas por el Dr. Carré, Director, y por el Dr. Rinjard, Director adjunto. [**Result of Experiments carried out at the Laboratory of the Ministry of Agriculture, France, with Professor José Lignières' Foot and Mouth Disease Vaccine. Official Conclusions signed by Dr. Carré, Director, and Dr. Rinjard, Deputy Director**].—*Rev. zootéc. Buenos Aires.* **20.** 75-76.

Immunity to foot and mouth disease was demonstrated in all guinea pigs vaccinated. [The numbers used, according to a paper by LIGNIÈRES, were 14 vaccinated and 14 controls].

The experiment upon bovines was vitiated by a serious reduction in the number of available animals. LIGNIÈRES vaccinated five cows, and these, when tested with virus, withstood infection. Only three control cows were inoculated and of these one failed to develop the disease. The virus used proved lethal for three calves. CARRÉ and RINJARD did not deem it wise to draw final conclusions from results upon this small number of bovines.—R. S. ROBERTS.

I. BIRCH-HIRSCHFELD, L. (1933). Untersuchungen über Ectromelia infectiosa. [**Experiments on Infectious Ectromelia of Mice**].—*Zlb. Bakt. I. (Orig.).* **129.** 274-284. 13 figs. on 2 plates. [3 refs.]

II. MCGAUGHEY, C. A., & WHITEHEAD, R. (1933). **Outbreaks of Infectious Ectromelia in Laboratory and Wild Mice.**—*J. Path. & Bact.* **37.** 253-256. 3 figs. on 1 plate, 1 table. [6 refs.]

I. The author confirms the general findings of earlier workers as regards the filtrability of the causal agent of this disease. He describes staining methods suitable for demonstrating elementary bodies and the essential tissue changes. The tissue reaction in the epithelium comprises the appearance of cellular inclusions and a gradual nuclear degeneration accompanied by a hydropic degeneration of the cells resulting in characteristic vesicle formation in the tissues.

II. The prevalence of infectious ectromelia in wild and laboratory mice is stressed. The findings of previous investigators is confirmed.—E. J. PULLINGER.

JOYEUX, C., & PIÉRI, J. (1933). Les animaux réservoirs du virus de la fièvre boutonneuse. [**Animal Reservoirs of the Virus of Marseilles Endemic Fever**].—*1er Congrès internat. Hyg. méditerranéenne. 1932.* **2.** 213-219. [12 refs.]

DURAND, P. (1933). Rôle du Chien comme réservoir de virus dans la fièvre

boutonneuse. [**Role of the Dog as Reservoir of the Virus in Marseilles Endemic Typhus**].—*Ibid.* 220-224.

NASTASI, A. (1933). La febbre esantematica mediterranea à Tripoli. [**Endemic Typhus in Tripoli**].—*Ibid.* 109-118. [21 refs.]

COMBIESCO, D. (1933). La fièvre exanthématique. (Fièvre boutonneuse en Roumanie). [**Endemic Typhus Fever in Roumania**].—*Ibid.* 119-129. [1 ref.]

MARCANDIER, & PIROT, R. (1933). Recherches expérimentales sur la fièvre boutonneuse observée à Toulon. [**Experimental Research on Marseilles Endemic Fever at Toulon**].—*Ibid.* 159-160.

NICOLLE, C. (1933). Les fièvres exanthématiques des pays méditerranéens. [**Marseilles Endemic Typhus**].—*Ibid.* 86-91.

JORGE, R. (1933). Le typhus et les fièvres exanthématiques. [**Typhus and Marseilles Endemic Typhus**].—*Ibid.* 92-97.

PLAZY, & GERMAIN. (1933). Typhus endémique bénin et fièvre boutonneuse. [**Endemic Typhus (Benign Type) and Marseilles Endemic Typhus**].—*Ibid.* 147-150. [5 refs.]

REITANO, U., & BONCINELLI, U. (1933). Recherches expérimentales sur la fièvre exanthématique. [**Experimental Research on Marseilles Endemic Fever**].—*Ibid.* 197-201.

This series of articles deals with three forms of typhus fever commonly occurring in Mediterranean countries. The forms are the classical typhus, benign typhus and endemic fever. There is controversy over the differentiation of these types one from another.

The dog is probably the chief natural reservoir of the virus of endemic fever. In one survey 49 out of 101 dogs, selected at random, gave positive Weil-Felix reactions [i.e. their sera agglutinated suspensions of *Bact. proteus* [*Proteus vulgaris*] X^{19} or X^{2}, an accepted phenomenon in typhus infection]. The common dog tick, *Rhipicephalus sanguineus*, transmits the infection and the virus can be demonstrated by the inoculation of infected tick emulsion into susceptible subjects. Canine carriers of infection show no clinical symptoms.—E. J. PULLINGER.

INVERTEBRATE VECTORS OF DISEASE.

I. IMES, M. (1932). **The Sheep Tick** [**Ked** = *Melophagus ovinus*] **and its Eradication by Dipping.**—*U. S. Dept. Agric. Farmers' Bull.* No. 798. pp. 22. 14 figs.

II. ROSSI, P. (1933). Observations sur les moeurs, habitudes et biologie des Ixodides du genre Hyalomma. [**Bionomics and Biology of** *Hyalomma* **Ticks**].—*Bull. Soc. Sci. vét. Lyon.* **36.** 109-116. [2 refs.]

I. The life history of the sheep ked [*Melophagus ovinus*, here referred to as a tick] is described and illustrated. Instructions are given for double dipping at an interval of 24 to 28 days. Nicotine may be used in 0·07 per cent. solution, and coal-tar-creosote and cresol dips are also of value ; when diluted for use, the latter should contain 0·5 per cent. of cresylic acid. Details and plans are given for the construction of dipping plants.

II. Rossi describes the characteristics of the genus *Hyalomma* and mentions that *H. mauretanicum* transmits *Theileria dispar*. It was found that relatively considerable distances could be traversed by these ticks, a female in one instance covering 50 m. in one hour ; there was no particular tendency to travel to north, south, east or west. Small obstacles were either surmounted or circum-

vented and light or shade provoked no observable reaction. Some preference was shown for walls, but the ticks do not usually ascend more than 60 to 65 cm. The slightest trace of moisture seemed, however, to be very repulsive to this genus of tick. Sounds were apparently not heard and even violent percussion of the soil near to the ticks was disregarded. Oviposition took place 12 to 15 days after engorgement and the larvae hatched 25 to 30 days later and were capable of living more than six months without feeding. The sense of smell appeared to be well developed and a concealed ox was apparently detected at 40 m. Haller's organs are considered to be olfactory, as after amputation the concealed ox was not detected. The ticks feed with avidity on cattle and do not despise human beings or dogs though they appear not to care for cats. [They can be reared on hedgehogs and sheep].—J. S. Steward.

Nash, T. A. M. (1933). **The Ecology of *Glossina morsitans*, Westw., and Two Possible Methods for its Destruction.—Part I.**—*Bull. Entomol. Res.* **24.** 107-157. 8 figs., 13 tables.

Nash has studied the yearly abundance of *G. morsitans* on three different fly-rounds, and the effect of seasonal and meteorological variations on the fly density. He shows that, in years of low rainfall, the tsetse community flourishes, but in years of abnormally heavy rainfall it may almost suffer extermination due to the inability of puparia to bear submergence or burial in water-logged soil for more than four days. In some districts it may perhaps be possible to utilize this knowledge to destroy *G. morsitans* by flooding its breeding grounds for not less than four days. It was found that game concentration or human activities in an area observed could mask the usual seasonal fluctuations of fly density.

Nash explains the seasonal fluctuations in fly density by correlation with the evaporative power of the air, there being a lag of two to five weeks in the effect of a fluctuation of the evaporation upon the density of *G. morsitans*. A mean monthly evaporation of 20 c.c. to 25 c.c. a day affords optimum conditions which it is believed affect the adult fly by increasing its longevity. Generally speaking, breeding was greatest when the evaporation curve approached the optimum zone.

Tsetses were seldom caught later than half an hour after sunset and reactivation after the night was found to take place only when a certain warmth and dryness had been attained.

After season, vegetation is considered to be the next most important influence. The best vegetation for breeding sites appeared to be *Brachystegia microphylla* woods, which provide good shade and retain their leaves for a long time and offer well-drained rock breeding sites for the fly. *Berlinia globiflora* affords good shade and log breeding sites, which are of particular value in dry years. *Combretum zeyheri* savannah and acacia form zones transitional between the breeding area and open feeding grounds.

The game factor is considered of less importance than either season or vegetation—only large movements of game producing noticeable effects upon the fly community.

G. morsitans is believed to hunt by sight, frequently following well-worn game paths and an artificial concentration of fly was produced by making four or five well worn paths converge at one point. It is suggested that this may be of great importance if a suitable trap be evolved for *G. morsitans*, as with one trap placed centrally and one at the distal end of each path it would be possible to trap a considerable area.—J. S. Steward.

DISEASES CAUSED BY METAZOAN PARASITES.

I. BREIDERT. (1933). Die Dasselbekämpfung. [**Warble Fly Control**].—*Berl. tierärztl. Wschr.* **49.** 425-426.

II. REISINGER, L. (1933). Beitrag zur Bekämpfung der Dasselfliegen des Rindes in Oesterreich. [**The Control of the Ox Warble Fly in Austria**].—*Wien. tierärztl. Mschr.* **20.** 641-650.

III. SPANN, J. (1933). Einiges über Schäden der Dasselfliege und die Erfolge ihrer Bekämpfung. [**Notes on Warble Fly Damage and the Success of Control Measures**].—*Münch. tierärztl. Wschr.* **84.** 549-551. 2 figs. [3 refs.]

I. The author defends a previous article on the value of " medol " in the destruction of warble larvae and reiterates that the preparation is effective and harmless to cattle.

II. This paper records the rather discouraging results of the anti-warble measures at Schladming in spite of the apparent efficacy in larvae destruction of Dr. Gattinger's tube paste, which was used. It is thought that the failure of the measures might have been due to warble flies being carried by the wind from a neighbouring area. Investigations into the larvicidal properties of various preparations of derris root, pyrethrum and nicotine are recorded and it is concluded that there is little to choose between them, but that the pyrethrum preparation is cheaper.

III. This article records observations on the loss in meat production, loss of milk, loss of butter fat and the damage to hides which result from warble fly infestation. In Germany, the annual loss in the value of hides is reckoned at RM. 9,000,000. As an instance of the success of anti-warble measures, it is recorded that, in the Garmisch district, 30,000 larvae were destroyed in 1929 and that by 1933 the number had been reduced to 1,283. In the first three years the measures were not fully enforced, and the author concludes that a heavily infected district can be freed from warble fly in two to three years, provided that surrounding areas are clean.—U. F. RICHARDSON.

I. SCHWERDT, I. (1933). Die Bekämpfung der Dasseln. [**The Campaign against Warble Flies**].—*Berl. tierärztl. Wschr.* **29.** 209-211. [2 refs.]

II. KOLBE, F. (1933). Hypoderma bovis und seine Bekämpfung. III. [*Hypoderma bovis* **and its Control. III**].—*Zschr. Fleisch- u. Milchhyg.* **43.** 209-211. [13 refs.]

I. This article deals with a meeting of the Warble Commission at the German Ministry of Agriculture, held on November 14th, 1932. The results of the various methods of treatment employed by the different workers during 1932 are discussed. Immunization proved to be unsatisfactory. Out of the number of remedies tested [most being of proprietary origin.—ED.] " sulfoliquid " 40 per cent., undiluted " sulfoliquid," " sulfodes ' M ' ," " sulfodes ' Bi ' ," hexaliquid, a mixture of equal quantities of petroleum and paraffin oil, pyrethrum extract, and warble oil were without any practical value. " Dasselsalbe " (Bengen) and vaseline were satisfactory, " delicia dasselöl," however, was the best, being successful in 92 per cent. of cases. The " kik " preparations were the next best. GÖTZE, a member of the Commission, points to his successful experiments with derris soap wash. The successful use of the crochet hook method in mass treatment of cattle in the Bavarian alps is recorded.

The Commission was unable to come to a definite decision concerning the question of mass or single treatment. Treatment should be adapted to local conditions.

The Commission is convinced that effective control of the warble fly will only be reached by official compulsory treatment. The proposed rules, however, cannot be defined till later.

The following measures were planned for the year 1933 :—

(1) Laboratory experiments at Hanover with derris and " delicia III," at Oldenburg with derris and immunization and at Weihenstephan by feeding extracts of larvae.

(2) Field experiments in Schleswig-Holstein with " delicia III " and derris soap wash on the islands and in Bavaria with the crochet hook method and " delicia dasselöl."

(3) Propaganda by a leaflet issued by the Reichsvertreter der Rinderzüchter, Berlin.

II. An independent account of the meeting referred to in I.

—R. WETZEL (HANOVER).

LÜHRS, E. (1933). Verlauf der Leberegelseuche in Oldenburg und ihre Bekämpfung. [**Course of Fascioliasis in Oldenburg and its Control**].—*Zschr. Infektkr. Haust.* **44.** 281-308. 1 fig., 2 tables, 3 charts. [14 refs.]

The author stresses the suitability of Oldenburg as a centre for research into the control of this disease because there are few importations and most of the cattle are slaughtered in the area. The paper deals almost entirely with cattle. VON SIMON and KAUME, HILDEBRAND, BARTZACK, and the author have already shown that losses due to liver fluke disease in north-west Germany include emaciation, milk failure and lack of breeding powers.

In different regions 80 to 100 per cent. of cattle and 99 to 100 per cent. of sheep are infected. During the seven years 1925 to 1931, 60 per cent. of cattle and sheep at the Oldenburg abattoir showed lesions and the tribute exacted by the liver fluke was RM. 16·50 per head.

Different methods of examination account for divergence of statistics, e.g. *post-mortem* examinations at abattoirs when compared with faecal examination for eggs. The control of the disease is in itself an important problem often underrated. It has in addition a serious aspect in political economy and there is the direct financial point of view. It is essential to take careful count of all the influences which affect the course of the disease.

There is an account of biological research work which has been carried out, including the effects of moisture and temperature on liver fluke eggs. The usual intermediate host (*Galba truncatula*) was not encountered. The life cycle of the parasite is five months, from egg to adult. Water is needed in all stages. Green food hastens the development in the host and winter fodder slows it down. The theoretical possibility of development is that a fluke producing 37,000 eggs can give rise to 6,660,000 young flukes. With an average infestation of ten flukes per host this figure becomes 66,600,000. Assuming that one in 1,000,000 of these reach maturity, ten old flukes will give rise to 66 new ones. Weather conditions are important. Live fluke disease of the spring depends upon the weather conditions of the outdoor months for cattle in the previous year. A graph covering seven years shows the relationship existing between meteorological conditions, fluke prevalence, turning out and rehousing in bovines.

A statistical enquiry deals with the prevalence of the disease separately in cows, bullocks and young stock.

With regard to control, treatment of cattle must go hand in hand with snail destruction. The anthelmintics recommended for cattle are certain proprietary preparations—distol, neo-serapis, distomal, filinol, egelin, igitol and hepol. A

first treatment should be given in November when the prevalence of the fluke as shown by graphs is at its height. As the animals are then housed they would be almost safe when turned out and would not infect the meadows. A single treatment is not efficacious because it will only kill the adult forms in the bile ducts; it is necessary to administer a second treatment some time in March or April to kill the parasites that have reached the liver in the meantime and become mature. Three months after turning out, the curve of prevalence rises again due to infection by encysted forms which have been in the meadows during the winter and a third treatment is therefore given in August. Five or six months after turning out fresh infective forms are ready to invade the host. In September or October the temperature falls below 10°C. and soon the cattle are indoors. Mild winters mean heavy spring infestations.

With regard to treatment of the land, the best way is by thorough drainage. As a land dressing, one part of copper sulphate to eight of sand is recommended. It can also be used with certain manures. Details of quantities per unit of area are given. Solutions of 1 : 50,000 can be used for ditches and ponds when low or dry. It is said that no damage results to animals or crops. Later, owing to its cost, copper sulphate had to be given up and "thomasmehl" (12 to 20 centals per hectare [480 to 800 lb. per acre] in spring and 8 centals per hectare [320 lb. per acre] in June and July) was used alone. A curve shows a drop in prevalence of fluke disease from over 80 per cent. in 1928 to less than 20 per cent. in 1931 and the weights of the animals improved.

It is suggested that, in badly affected areas, farmers' organizations should join with veterinary surgeons in exterminating the disease. Flooding could be prevented by co-operation and this would lessen reinfection.—A. W. N. PILLERS.

I. SWALES, W. E. (1933). **A Review of Canadian Helminthology. I. The Present Status of Knowledge of the Helminth Parasites of Domesticated and Semidomesticated Mammals and Economically Important Birds in Canada, as Determined from Work Published Prior to 1933. II. Additions to Part I. as Determined from a Study of Parasitic Helminths Collected in Canada.**—*Canad. J. Res.* **8.** 468-477 and 478-482. 2 check lists. [37 refs.]

II. BUCKLEY, J. J. C. (1933). **Some Helminth Parasites from Domesticated Animals in Southern Rhodesia.**—*J. Helminthol.* **11.** 109-114. [3 refs.]

I. In these two papers Swales reviews the occurrence and distribution of helminths in domesticated animals, economically important birds and furbearing animals in Canada. The first paper gives a short sketch of Canadian parasitology and a check list of helminths reported for Canada in publications prior to 1933, and the second paper gives a list of helminths collected in Canada and identified by the author.

II. This paper reports on the examination of a collection of 25 different species of parasitic worms collected from domesticated animals in Southern Rhodesia. *Avitellina sudanea*, *Gaigeria pachyscelis* and *Globocephalus urosubulatus* are among those mentioned, also *Cooperia punctata* found in the pig.

—E. L. TAYLOR.

I. ALBRECHT. (1933). Neuere Forschungen und Beobachtungen über die Askaridiasis bei Pferden. [**Ascaridiasis in Horses**].—*Deuts. tierärztl. Wschr.* **41.** 535-537. [29 refs.]

II. LETARD, E. (1933). Hérédité des maladies parasitaires. Ascaridiose prénatale. [**Heredity in Parasitic Diseases. Prenatal Ascaridiasis**].—*Rev. vét. et J. Méd. vét.* **85.** 440-442.

I. This is a general account and review of the life cycle and allergic reactions of the ascaris of the horse and its treatment. It is pointed out that the infective egg is swallowed and that the larva journeys to the lungs, then up the trachea and finally down the oesophagus to the small bowel.

The allergic syndrome of asthma and urticaria is discussed and so are the intradermal, subcutaneous and general effects of ascaris extracts in affected and non-affected animals. The clinical experiences, favourable and otherwise, of several writers with a number of common anthelmintics are quoted.

II. The author describes an illness of four puppies which at birth were put on a foster bitch, which already had four pups some days old. On the 24th to 28th day the adopted pups became ill and lost flesh rapidly. They then vomited or passed in liquid faeces numerous *Belascaris marginata* (*Toxocara canis*) the females of which contained eggs. After this they were soon restored to health. The other puppies remained quite well. The works of STEWART, YOSHIDA, RANSOM and FOSTER, FÜLLEBORN, SHILLINGER and CRAM, and AKAGI on the life history of ascarids are quoted. The worker last mentioned is stated to have found, that five days after hatching, the larvae of *B. marginata* leave the lungs for the trachea and become adult in 21 to 25 days. He argues that the illness of the puppies was due to prenatal infection. The work of HADLEY, WARWICK and GILDOW on the deaths of very young silver foxes from pulmonary lesions due to larval ascarids is mentioned, and also that of HENRY on still-born foxes from a similar cause. Prenatal infestation with ascarids therefore causes two diseases, one in the lungs and one later in the intestines. It is a condition which must receive the attention not only of pathologists, but of veterinary surgeons and breeders.—A. W. N. PILLERS.

ZAWADOWSKY, M. M., & ZVJAGUINTZEV, S. N. (1933). **The Seasonal Fluctuation in the Number of Eggs of *Nematodirus* sp. in Feces.**—*J. Parasitol.* **19.** 269-279. 1 table, 3 graphs.

Weekly observations were made on the relative number of eggs of *N. helvetianus* in the faeces of a llama throughout 24 consecutive months, and it was found that the dissemination of eggs is at its lowest in the early spring and at its highest in late summer. As a reason for this fluctuation it is suggested that, resultant upon the inhibition of development of the eggs during the winter, there is a mass development of larvae in the spring, as soon as warmer weather appears. The authors base the argument by which they arrive at this conclusion upon the supposition [which now appears much less certain than it used to do] that the number of eggs is a reliable index of the number of worms present in the intestine. As the egg count falls so rapidly after reaching its highest point, they further conclude that the parasitic worm must be very short lived.—E. L. TAYLOR.

DISEASES, GENERAL.

I. IVES, L. D. (1933). **The Character and Extent of Poultry Diseases as Evidenced by Data Obtained in Government Inspection Work.**—*J. Amer. Vet. Med. Ass.* **82.** 480-486. 3 tables.

II. —. (1933). **Report of Committee on Transmissible Diseases of Poultry.**—*Ibid.* 487.

I. The regulations of the New York City Department of Health require the inspection of all live poultry unloaded for sale in the city. The New York Live Poultry Commission Merchant's Association was responsible for the passing of

these regulations. The inspection service costs the poultry industry about $60,000 a year. At each railroad terminus there is stationed a veterinary inspector who handles a representative bird from each car. When disease is found, the car is marked for disinfection. During six years 65,000 cars of live poultry were inspected. 6,000 cars contained overcropped or otherwise unsuitable birds for unloading. Infectious diseases were found in birds in 1,400 cars. 175,000 sick birds were destroyed. The principal causes of rejection were roup or infectious laryngotracheitis. Over 200,000 birds were condemned from cars other than those in which a general diseased condition existed, the main causes being emaciation, roup, dropsy, bruises, fractures, toxaemia or the fact that the birds were in a moribund condition.

A dressed poultry inspection is carried out by the Bureau of Agricultural Economics, in a group of plants in the north-eastern section of the United States. The inspection is carried out by a veterinary inspector. Nearly 30,000,000 birds have been examined at these plants, 950,000 being rejected as unfit for food. Of these ; 65·5 per cent. were tuberculous, 15 per cent. decomposed, 7 per cent. affected with septicaemia, 3·5 per cent. emaciated and 9 per cent. were found in other diseased conditions.

It is considered that the live and dressed poultry inspection has been of real benefit both to the poultry industry and to the consuming public.

II. The Committee requests the continuance of the investigations into the problems of avian tuberculosis, fowl paralysis, laryngotracheitis, pullorum disease, leucosis, fowl cholera and internal parasites. They also request that the veterinary practitioners should manifest a more sympathetic interest in poultry problems and that the veterinary colleges should enrich their curricula with more extensive courses and arrange short courses on poultry diseases for practitioners.

—NORMAN DOBSON.

BAYON, H. P. (1933). **Recent Advances in our Knowledge of Poultry Diseases. Lecture III. Fowl-Pox and Fowl Canker ; Coccidiosis.**—*Vet. Rec.* **13.** 940-947. 1 fig.

The author considers that the comb form and the mouth form of the disease are simply different manifestations of the same virus. He states that in the comb form the virus acts on the epithelium of the skin and that in the mouth form the lesions develop on the mucous membranes.

In his experimental birds cross-infection was rare, but he did not state whether he had undertaken any experimental work in this connection. For both forms of the disease he recommended curative treatment, with which most workers will not agree. [It has been shown that the treatment of such affected birds is both scientifically and economically unsound]. The author found that, using pigeon pox vaccine, about one-third of the birds vaccinated failed to " take." [This has not been the experience of persons using the vaccine on a very large scale].

Dealing with coccidiosis, Bayon discusses the incidence, spread, symptoms, aetiology and the life cycle of the parasite. He found that, to obtain a favourable survival rate of the chicks, nothing appeared to be so effective as the addition of skim milk to the mash and a generous diet.

The author considers that the prevention of coccidiosis is a matter of plan or system, not of drugs.—NORMAN DOBSON.

HARBOU, J. (1933). Sterilitet hos Kvaeg. **[Bovine Sterility].**—*Maanedsskr. Dyrl.* **45.** 291-302.

The most frequent and, in the author's opinion, the most important cause of

sterility in cows is chronic catarrhal endometritis. In these cases he has seen extremely favourable results from irrigation with entozon or the insertion of entozon pessaries. Such cases of endometritis often occur in herds in an enzootic manner. On the basis of the favourable effects of the entozon the author believes that these disorders are due to a streptococcal infection contracted at parturition. In a number of cases he has treated heifers, in which sexual function was absent or delayed, with prolan injections, with the result that in nine out of 12 heifers oestrum occurred within 21 days. In seven of the heifers the oestrum appeared within 12 days after the first injection.

—H. C. Bendixen (Copenhagen).

Ilmjarv, M. (1933). 1862.a. Tori kasvandusele ostetud ardenni sugumärade ahtruse põhjuseid. **[The Causes of Sterility in Ardenne Mares bought in 1862 for the Tori Stud].**—*Eesti Loomaarst. Ring.* **9.** 44-51. 3 tables. [6 refs.] [Abst. from abst. in German by H. Richter (Tartu)].

Many Ardenne mares imported into Estonia and mated with Ardenne, Arab or Estonian stallions failed to produce foals. The author examined the records and ascribed the sterility to (1) the undersize of some stallions ; (2) the fact that some of the mares were too old for breeding ; (3) the failure of some mares to become acclimatized ; (4) genital disease and (5) joint-ill infection.

Ardenne mares were not used for breeding after this experience.—J. E.

Smith, A. D. Buchanan. (1933). **Sterility in Farm Live Stock.**—*Scot. J. Agric.* **16** 282-293.

This article has been compiled from data collected by the Scottish Committee of Research Workers' Sterility Sub-Committee. It is a systematic account of the knowledge of the causal factors of sterility in farm animals, with particular reference to cattle. The matter is dealt with under the headings of disease, nutrition and heredity and reference is made to two recent allied publications on the nutritional and hereditary factors in sterility, published respectively by the Imperial Bureau of Animal Nutrition and the Imperial Bureau of Animal Genetics. [(1932). " Nutrition in Relation to Reproduction with Special Reference to Sterility in Farm Animals " and (1932). " Physiological and Genetical Aspects of Sterility in Domesticated Animals "].—J. E.

Krediet, G. (1933). Kastration intersexueller Säugetiere. **[Castration of Hermaphrodite Mammals].**—*Acta vet. neerland.* **1.** No. 1. pp. 120. 37 figs., 7 tables. [2 refs.] [Orig. in German].

The consequences of castration of normal female or male animals have been known for some time and have become the basis of further research work on gland grafting and hormone therapy. The results with hermaphrodites differ, as these possess both male and female organs and characters.

It appears from recent experiments that hermaphrodites owe their existence to a change of sex, whereby a change of female into male occurs during the foetal development. As with normal animals, it seems probable that the sexual organs and characters are governed by the gonads. Extensive research work was carried out by Krediet on the consequences of the castration of hermaphrodite pigs and goats. The results showed that the gonad has a direct influence on the sexual apparatus and that the hermaphrodite is not an animal possessing mixed properties, but an animal between male and female whose sexual organs and characters are influenced according to the sex characters of the gonads.—A. Klarenbeek (Utrecht).

RUIZ MARTÍNEZ, C. (1933). Contribución al estudio de la esteatonecrosis. [**Contribution to the Study of Fat Necrosis**].—*Trab. Inst. Biol. anim. Madrid.* **1.** 99-104. 8 figs.

The condition referred to is a multiple focal necrosis of the pancreas in which the tissue necrosis is accompanied by a fat-splitting process. The histopathology of human cases studied by the author is described. His findings are in agreement with the view that the condition is secondary and results from a backward flow of trypsin, which, injuring the pancreatic tissue, allows the pancreatic juice to break down fats *in situ* in the pancreas.

The condition has been reported in adult pigs on several occasions.

—R. S. ROBERTS.

PATTERSON, F. D., WILCKE, H. L., MURRAY, C., & HENDERSON, E. W. (1932). **So-Called Range Paralysis of the Chicken.**—*J. Amer. Vet. Med. Ass.* **81.** 747-767. 5 figs., 2 tables. [35 refs.]

Under the heading of " Clinical Studies " the authors give details of the greatly varying forms of paralysis, eye changes and other features associated with this condition. The characteristic lesions found in affected nerves are enlargements with lymphoid-like tissue infiltrations. The infiltration tissue is tumour-like and comparatively soft although well organized. Tumour-like infiltrations that are apparently of the same type as those described in the nerve lesions have been found in practically all the organs and tissues of the body, notably in the liver, kidney, spleen [and ovary].

The eye condition is fully described. Experiments were carried out to test the transmission of the condition by means of the injection of a suspension from markedly affected tissues of a typical nerve case, from infiltrated liver and ovary of a hen which did not show any eye or nerve lesions, and infiltrated liver, kidney and ovary of a positive case from the first group. The intraperitoneal route was used in these attempts to infect birds artificially. It is stated that as many as 76·9 per cent. of the birds in some groups became affected. The injection of a suspension made from one type of lesion apparently produces practically all the types that are considered as expressions of this disease. Contact infections are stated to have been successful in as much as 57·8 per cent. in some groups.

The results from Berkefeld filtrate transmission experiments were very irregular and apparently do not warrant definite conclusions being drawn. The age of the birds used in these experiments is not stated.

The progeny of affected females from badly involved flocks were mated to an " apparently " healthy male. In two years time 51 per cent. of the progeny of this mating were positively affected. From this and other experiments the authors draw the conclusion that transmission is through the egg.

The incubation period following intraperitoneal inoculation appears to be about two months. The clinical course of the condition may vary from a few weeks to more than a year. Complete recovery from the condition has rarely if ever been noted.

[It has not been proved that the disease is caused by a virus. The appearance of the disease in the offspring of affected birds may be due to a genetical factor, susceptibility or even infection from contaminated ground or houses, etc.].

—NORMAN DOBSON.

ARROYO MARTÍN, C. (1933). Contribución al estudio del bocio en los animales. Estudio de las alteraciones histológicas en un bocio parenquimatoso tireo ¿paratiréogeno ? en un cordero. [**Contribution to the Study of Goitre in**

Animals. Study of the Histological Changes in a Case of Parenchymatous Goitre, involving the Thyroid, and possibly the Parathyroid, Glands in a Lamb].—*Trab. Inst. Biol. anim. Madrid.* **1.** 116-139. 17 figs. [18 refs.]

The gross and microscopic structure of an enlarged thyroid gland in a lamb are described. Degeneration, with vacuole formation in the cytoplasm and nuclei, was noted in the vesicular cells.—R. S. Roberts.

Cinotti, F. (1932). Osservazioni cliniche sulla " pitirosi " (Malattia da Crusca) negli Equini. [**Clinical Observations on " Pitirosi " (Disease caused by Bran) [Osteoporosis] in Equines**].—*Nuova Vet.* **10.** No. 6, 12-19 ; No. 7, 19-25 ; No. 8, 19-26 ; No. 9, 16-24 ; No. 10, 21-28 and No. 11, 31-36. 60 figs.

The author gives the name " pitirosi " to a bone disease of equines and bovines characterized by acidosis and by a deficiency of lime in the body due to an excessive intake of phosphoric acid in a diet too rich in bran. The disease is assuming an enzootic character in some localities of Campania (Naples), where there are numerous mills. [It also occurs in the Philippine Islands, see this *Bull.* **3.** 264].

The symptomatology is dealt with in detail ; osteomalacia [osteofibrosis ?] is predominant as a *post-mortem* lesion.

The treatment consists in discontinuing the bran and in the administration of calcium carbonate.

For demonstration purposes, donkeys affected with " pitirosis " at the initial stage were fed exclusively with bran *ad lib.* plus increasing daily doses of a phosphoric acid until they were reduced to a marasmatic condition and could not stand up ; a change of diet to hay and straw greatly improved the general condition within a period of 10 to 15 days.

The article is fully illustrated with pictures of affected horses and of affected bones.—F. Veglia (Turin).

Henry, M., & Benjamin, M. S. (1933). **Mineral Deficiency in the Southern Coastal Belt of New South Wales. A Preliminary Survey.**—*Agric. Gaz. New South Wales.* **44.** 11-18, 119-123 and 231-237. 12 tables. [15 refs.] [Also published as *Dept. Agric. New South Wales Sci. Bull.* No. 42. pp. 21 with 1 map].

Clinical evidence of aphosphorosis has been observed in many parts of New South Wales, but especially in the dairying districts of the south coast, where this investigation was conducted. Clinical data have been collected and soil and pasture analyses carried out. The phosphorus content of soils was found to be extremely low in many instances. The average analysis of soils where cattle show definite clinical evidence of deficiency is as follows :—" citrate-soluble " phosphorus (calculated as P_2O_5) 0·0015 per cent., " citrate-soluble " calcium (calculated as CaO) 0·088 per cent., pH 5.45. Pastures from these affected areas contain on the average 0·272 per cent. P, 0·575 per cent. Ca and 8·05 per cent. crude protein.

From areas which are not affected, the following average values were obtained :—(soil) P, 0·0056 per cent. ; Ca, 0·229 per cent. ; pH, 6·08 ; (pasture) P, 0·437 per cent. ; Ca, 0·66 per cent. ; crude protein, 11 per cent. Affected areas appear to have soils with a relatively low percentage of " citrate-soluble " P coincident with a marked acid reaction. Factors which affect the chemical composition and grazing value of pasture are discussed together with the Ca and P content of pasture and stock foods in relation to the requirements of dairy cattle.

—W. I. B. Beveridge.

LESLIE, A. (1933). **Some Aspects of Dental Attrition in New Zealand Sheep. Data from a Canterbury Investigation.**—*New Zealand J. Agric.* **47.** 149-153.

Observations were made at Canterbury to find whether physically hard feeding conditions were actually the reason for excessive wear of incisor teeth. The first changes were noted to be a darkening of the central incisors with erosion and breaking of the surfaces. It is stated that 70 per cent. of ewes are culled for failing teeth one or two years before it should be necessary. Leslie believes that the physical nature of the diet alone cannot be blamed for the defects in teeth, but that other nutritional factors such as deficiency of lime are implicated. Hoggets fed on bone meal and cod liver oil had better teeth than controls, and young dry ewes better teeth than pregnant ewes of the same age.—C. S. M. HOPKIRK.

I. MCGOWAN, J. P. (1933). **Some Observations on Rickets, with Special Reference to its Occurrence in Pigs.**—*Brit. Med. J.* Sept. 30th. 599-602. 5 figs. [28 refs.]

II. SMITH, Jean. (1933). **Phosphatase Test for Rickets.**—*Lancet.* **225.** 549. [1 ref.]

I. Observations were made on rickets in pigs during the period 1922-1931. It is pointed out that an absence of calcium in the diet leads to the onset of osteoporosis, which cannot be cured or prevented by cod liver oil, vitamin D or sunlight. The balancing of the CaO with the P_2O_5 of the ration did not prevent the development of rickets.

The administration of Ca alone does not prevent " latent " rickets developing into " patent " rickets, but cod liver oil is effective in this regard. The true function of vitamin D is discussed in the light of the author's observation. Considerable stress is laid on the necessity for examining the histopathology of lesions, said to be those of rickets, so that errors in research may be avoided.

II. Ordinary artificially fed infants have an increased phosphatase content of the blood plasma. This figure can be reduced by the addition of fat soluble vitamin. A similar increase in the phosphatase content is observed in rickets. Estimation of the phosphatase content may aid diagnosis in rickets.

—GEO. F. BODDIE.

IMMUNITY.

MELLO, A. (1933). Do estudo das reações tuberculinicas não especificas. [**Study of Non-Specific Tuberculin Reactions**].—*Rev. Soc. Paulista Med. vet. São Paulo.* **3.** 74-82. [5 refs.]

A few original observations are recorded, but the article is principally intended to draw attention to recent literature dealing with irregular results obtained with the intradermal tuberculin test.—R. S. ROBERTS.

MENKIN, V. (1933). **Studies on Inflammation. IX. A Factor in the Mechanism of Invasiveness by Pyogenic Bacteria.**—*J. Exp. Med.* **57.** 977-991. 8 figs. on 2 plates, 3 tables. [15 refs.]

An irritant, when introduced into the tissues, sets up an inflammatory reaction which sooner or later causes the formation of a local barrier which hinders the extension of the irritant to the surrounding tissues. This local barrier is a form of mechanical obstruction caused by thrombosed lymphatics or a fibrinous network. The rapidity with which such barriers are formed varies with the irritant.

In this paper an account is given of a study of the relative rapidity with which

vented and light or shade provoked no observable reaction. Some preference was shown for walls, but the ticks do not usually ascend more than 60 to 65 cm. The slightest trace of moisture seemed, however, to be very repulsive to this genus of tick. Sounds were apparently not heard and even violent percussion of the soil near to the ticks was disregarded. Oviposition took place 12 to 15 days after engorgement and the larvae hatched 25 to 30 days later and were capable of living more than six months without feeding. The sense of smell appeared to be well developed and a concealed ox was apparently detected at 40 m. Haller's organs are considered to be olfactory, as after amputation the concealed ox was not detected. The ticks feed with avidity on cattle and do not despise human beings or dogs though they appear not to care for cats. [They can be reared on hedgehogs and sheep].—J. S. Steward.

Nash, T. A. M. (1933). **The Ecology of** *Glossina morsitans*, **Westw., and Two Possible Methods for its Destruction.—Part I.**—*Bull. Entomol. Res.* **24.** 107-157. 8 figs., 13 tables.

Nash has studied the yearly abundance of *G. morsitans* on three different fly-rounds, and the effect of seasonal and meteorological variations on the fly density. He shows that, in years of low rainfall, the tsetse community flourishes, but in years of abnormally heavy rainfall it may almost suffer extermination due to the inability of puparia to bear submergence or burial in water-logged soil for more than four days. In some districts it may perhaps be possible to utilize this knowledge to destroy *G. morsitans* by flooding its breeding grounds for not less than four days. It was found that game concentration or human activities in an area observed could mask the usual seasonal fluctuations of fly density.

Nash explains the seasonal fluctuations in fly density by correlation with the evaporative power of the air, there being a lag of two to five weeks in the effect of a fluctuation of the evaporation upon the density of *G. morsitans.* A mean monthly evaporation of 20 c.c. to 25 c.c. a day affords optimum conditions which it is believed affect the adult fly by increasing its longevity. Generally speaking, breeding was greatest when the evaporation curve approached the optimum zone.

Tsetses were seldom caught later than half an hour after sunset and reactivation after the night was found to take place only when a certain warmth and dryness had been attained.

After season, vegetation is considered to be the next most important influence. The best vegetation for breeding sites appeared to be *Brachystegia microphylla* woods, which provide good shade and retain their leaves for a long time and offer well-drained rock breeding sites for the fly. *Berlinia globiflora* affords good shade and log breeding sites, which are of particular value in dry years. *Combretum zeyheri* savannah and acacia form zones transitional between the breeding area and open feeding grounds.

The game factor is considered of less importance than either season or vegetation—only large movements of game producing noticeable effects upon the fly community.

G. morsitans is believed to hunt by sight, frequently following well-worn game paths and an artificial concentration of fly was produced by making four or five well worn paths converge at one point. It is suggested that this may be of great importance if a suitable trap be evolved for *G. morsitans*, as with one trap placed centrally and one at the distal end of each path it would be possible to trap a considerable area.—J. S. Steward.

DISEASES CAUSED BY METAZOAN PARASITES.

I. BREIDERT. (1933). Die Dasselbekämpfung. **[Warble Fly Control]**.—*Berl. tierärztl. Wschr.* **49.** 425-426.

II. REISINGER, L. (1933). Beitrag zur Bekämpfung der Dasselfliegen des Rindes in Oesterreich. **[The Control of the Ox Warble Fly in Austria]**.—*Wien. tierärztl. Mschr.* **20.** 641-650.

III. SPANN, J. (1933). Einiges über Schäden der Dasselfliege und die Erfolge ihrer Bekämpfung. **[Notes on Warble Fly Damage and the Success of Control Measures]**.—*Münch. tierärztl. Wschr.* **84.** 549-551. 2 figs. [3 refs.]

I. The author defends a previous article on the value of " medol " in the destruction of warble larvae and reiterates that the preparation is effective and harmless to cattle.

II. This paper records the rather discouraging results of the anti-warble measures at Schladming in spite of the apparent efficacy in larvae destruction of Dr. Gattinger's tube paste, which was used. It is thought that the failure of the measures might have been due to warble flies being carried by the wind from a neighbouring area. Investigations into the larvicidal properties of various preparations of derris root, pyrethrum and nicotine are recorded and it is concluded that there is little to choose between them, but that the pyrethrum preparation is cheaper.

III. This article records observations on the loss in meat production, loss of milk, loss of butter fat and the damage to hides which result from warble fly infestation. In Germany, the annual loss in the value of hides is reckoned at RM. 9,000,000. As an instance of the success of anti-warble measures, it is recorded that, in the Garmisch district, 30,000 larvae were destroyed in 1929 and that by 1933 the number had been reduced to 1,283. In the first three years the measures were not fully enforced, and the author concludes that a heavily infected district can be freed from warble fly in two to three years, provided that surrounding areas are clean.—U. F. RICHARDSON.

I. SCHWERDT, I. (1933). Die Bekämpfung der Dasseln. **[The Campaign against Warble Flies]**.—*Berl. tierärztl. Wschr.* **29.** 209-211. [2 refs.]

II. KOLBE, F. (1933). Hypoderma bovis und seine Bekämpfung. III. [*Hypoderma bovis* **and its Control. III**].—*Zschr. Fleisch- u. Milchhyg.* **43.** 209-211. [13 refs.]

I. This article deals with a meeting of the Warble Commission at the German Ministry of Agriculture, held on November 14th, 1932. The results of the various methods of treatment employed by the different workers during 1932 are discussed. Immunization proved to be unsatisfactory. Out of the number of remedies tested [most being of proprietary origin.—ED.] " sulfoliquid " 40 per cent., undiluted " sulfoliquid," " sulfodes ' M '," " sulfodes ' Bi '," hexaliquid, a mixture of equal quantities of petroleum and paraffin oil, pyrethrum extract, and warble oil were without any practical value. " Dasselsalbe " (Bengen) and vaseline were satisfactory, " delicia dasselöl," however, was the best, being successful in 92 per cent. of cases. The " kik " preparations were the next best. GÖTZE, a member of the Commission, points to his successful experiments with derris soap wash. The successful use of the crochet hook method in mass treatment of cattle in the Bavarian alps is recorded.

The Commission was unable to come to a definite decision concerning the question of mass or single treatment. Treatment should be adapted to local conditions.

The Commission is convinced that effective control of the warble fly will only be reached by official compulsory treatment. The proposed rules, however, cannot be defined till later.

The following measures were planned for the year 1933 :—

(1) Laboratory experiments at Hanover with derris and " delicia III," at Oldenburg with derris and immunization and at Weihenstephan by feeding extracts of larvae.

(2) Field experiments in Schleswig-Holstein with " delicia III " and derris soap wash on the islands and in Bavaria with the crochet hook method and " delicia dasselöl."

(3) Propaganda by a leaflet issued by the Reichsvertreter der Rinderzüchter, Berlin.

II. An independent account of the meeting referred to in I.

—R. WETZEL (HANOVER).

LÜHRS, E. (1933). Verlauf der Leberegelseuche in Oldenburg und ihre Bekämpfung. **[Course of Fascioliasis in Oldenburg and its Control].**—*Zschr. Infektkr. Haust.* **44.** 281-308. 1 fig., 2 tables, 3 charts. [14 refs.]

The author stresses the suitability of Oldenburg as a centre for research into the control of this disease because there are few importations and most of the cattle are slaughtered in the area. The paper deals almost entirely with cattle. VON SIMON and KAUME, HILDEBRAND, BARTZACK, and the author have already shown that losses due to liver fluke disease in north-west Germany include emaciation, milk failure and lack of breeding powers.

In different regions 80 to 100 per cent. of cattle and 99 to 100 per cent. of sheep are infected. During the seven years 1925 to 1931, 60 per cent. of cattle and sheep at the Oldenburg abattoir showed lesions and the tribute exacted by the liver fluke was RM. 16·50 per head.

Different methods of examination account for divergence of statistics, e.g. *post-mortem* examinations at abattoirs when compared with faecal examination for eggs. The control of the disease is in itself an important problem often underrated. It has in addition a serious aspect in political economy and there is the direct financial point of view. It is essential to take careful count of all the influences which affect the course of the disease.

There is an account of biological research work which has been carried out, including the effects of moisture and temperature on liver fluke eggs. The usual intermediate host (*Galba truncatula*) was not encountered. The life cycle of the parasite is five months, from egg to adult. Water is needed in all stages. Green food hastens the development in the host and winter fodder slows it down. The theoretical possibility of development is that a fluke producing 37,000 eggs can give rise to 6,660,000 young flukes. With an average infestation of ten flukes per host this figure becomes 66,600,000. Assuming that one in 1,000,000 of these reach maturity, ten old flukes will give rise to 66 new ones. Weather conditions are important. Live fluke disease of the spring depends upon the weather conditions of the outdoor months for cattle in the previous year. A graph covering seven years shows the relationship existing between meteorological conditions, fluke prevalence, turning out and rehousing in bovines.

A statistical enquiry deals with the prevalence of the disease separately in cows, bullocks and young stock.

With regard to control, treatment of cattle must go hand in hand with snail destruction. The anthelmintics recommended for cattle are certain proprietary preparations—distol, neo-serapis, distomal, filinol, egelin, igitol and hepol. A

first treatment should be given in November when the prevalence of the fluke as shown by graphs is at its height. As the animals are then housed they would be almost safe when turned out and would not infect the meadows. A single treatment is not efficacious because it will only kill the adult forms in the bile ducts; it is necessary to administer a second treatment some time in March or April to kill the parasites that have reached the liver in the meantime and become mature. Three months after turning out, the curve of prevalence rises again due to infection by encysted forms which have been in the meadows during the winter and a third treatment is therefore given in August. Five or six months after turning out fresh infective forms are ready to invade the host. In September or October the temperature falls below 10°C. and soon the cattle are indoors. Mild winters mean heavy spring infestations.

With regard to treatment of the land, the best way is by thorough drainage. As a land dressing, one part of copper sulphate to eight of sand is recommended. It can also be used with certain manures. Details of quantities per unit of area are given. Solutions of 1 : 50,000 can be used for ditches and ponds when low or dry. It is said that no damage results to animals or crops. Later, owing to its cost, copper sulphate had to be given up and "thomasmehl" (12 to 20 centals per hectare [480 to 800 lb. per acre] in spring and 8 centals per hectare [320 lb. per acre] in June and July) was used alone. A curve shows a drop in prevalence of fluke disease from over 80 per cent. in 1928 to less than 20 per cent. in 1931 and the weights of the animals improved.

It is suggested that, in badly affected areas, farmers' organizations should join with veterinary surgeons in exterminating the disease. Flooding could be prevented by co-operation and this would lessen reinfection.—A. W. N. Pillers.

I. Swales, W. E. (1933). **A Review of Canadian Helminthology. I. The Present Status of Knowledge of the Helminth Parasites of Domesticated and Semidomesticated Mammals and Economically Important Birds in Canada, as Determined from Work Published Prior to 1933. II. Additions to Part I. as Determined from a Study of Parasitic Helminths Collected in Canada.**—*Canad. J. Res.* **8.** 468-477 and 478-482. 2 check lists. [37 refs.]

II. Buckley, J. J. C. (1933). **Some Helminth Parasites from Domesticated Animals in Southern Rhodesia.**—*J. Helminthol.* **11.** 109-114. [3 refs.]

I. In these two papers Swales reviews the occurrence and distribution of helminths in domesticated animals, economically important birds and furbearing animals in Canada. The first paper gives a short sketch of Canadian parasitology and a check list of helminths reported for Canada in publications prior to 1933, and the second paper gives a list of helminths collected in Canada and identified by the author.

II. This paper reports on the examination of a collection of 25 different species of parasitic worms collected from domesticated animals in Southern Rhodesia. *Avitellina sudanea*, *Gaigeria pachyscelis* and *Globocephalus urosubulatus* are among those mentioned, also *Cooperia punctata* found in the pig.

—E. L. Taylor.

I. Albrecht. (1933). Neuere Forschungen und Beobachtungen über die Askaridiasis bei Pferden. [**Ascaridiasis in Horses**].—*Deuts. tierärztl. Wschr.* **41.** 535-537. [29 refs.]

II. Letard, E. (1933). Hérédité des maladies parasitaires. Ascaridiose prénatale. [**Heredity in Parasitic Diseases. Prenatal Ascaridiasis**].—*Rev. vét. et J. Méd. vét.* **85.** 440-442.

I. This is a general account and review of the life cycle and allergic reactions of the ascaris of the horse and its treatment. It is pointed out that the infective egg is swallowed and that the larva journeys to the lungs, then up the trachea and finally down the oesophagus to the small bowel.

The allergic syndrome of asthma and urticaria is discussed and so are the intradermal, subcutaneous and general effects of ascaris extracts in affected and non-affected animals. The clinical experiences, favourable and otherwise, of several writers with a number of common anthelmintics are quoted.

II. The author describes an illness of four puppies which at birth were put on a foster bitch, which already had four pups some days old. On the 24th to 28th day the adopted pups became ill and lost flesh rapidly. They then vomited or passed in liquid faeces numerous *Belascaris marginata* (*Toxocara canis*) the females of which contained eggs. After this they were soon restored to health. The other puppies remained quite well. The works of STEWART, YOSHIDA, RANSOM and FOSTER, FÜLLEBORN, SHILLINGER and CRAM, and AKAGI on the life history of ascarids are quoted. The worker last mentioned is stated to have found, that five days after hatching, the larvae of *B. marginata* leave the lungs for the trachea and become adult in 21 to 25 days. He argues that the illness of the puppies was due to prenatal infection. The work of HADLEY, WARWICK and GILDOW on the deaths of very young silver foxes from pulmonary lesions due to larval ascarids is mentioned, and also that of HENRY on still-born foxes from a similar cause. Prenatal infestation with ascarids therefore causes two diseases, one in the lungs and one later in the intestines. It is a condition which must receive the attention not only of pathologists, but of veterinary surgeons and breeders.—A. W. N. PILLERS.

ZAWADOWSKY, M. M., & ZVJAGUINTZEV, S. N. (1933). **The Seasonal Fluctuation in the Number of Eggs of *Nematodirus* sp. in Feces.**—*J. Parasitol.* **19.** 269-279. 1 table, 3 graphs.

Weekly observations were made on the relative number of eggs of *N. helvetianus* in the faeces of a llama throughout 24 consecutive months, and it was found that the dissemination of eggs is at its lowest in the early spring and at its highest in late summer. As a reason for this fluctuation it is suggested that, resultant upon the inhibition of development of the eggs during the winter, there is a mass development of larvae in the spring, as soon as warmer weather appears. The authors base the argument by which they arrive at this conclusion upon the supposition [which now appears much less certain than it used to do] that the number of eggs is a reliable index of the number of worms present in the intestine. As the egg count falls so rapidly after reaching its highest point, they further conclude that the parasitic worm must be very short lived.—E. L. TAYLOR.

DISEASES, GENERAL.

I. IVES, L. D. (1933). **The Character and Extent of Poultry Diseases as Evidenced by Data Obtained in Government Inspection Work.**—*J. Amer. Vet. Med. Ass.* **82.** 480-486. 3 tables.

II. —. (1933). **Report of Committee on Transmissible Diseases of Poultry.**—*Ibid.* 487.

I. The regulations of the New York City Department of Health require the inspection of all live poultry unloaded for sale in the city. The New York Live Poultry Commission Merchant's Association was responsible for the passing of

these regulations. The inspection service costs the poultry industry about $60,000 a year. At each railroad terminus there is stationed a veterinary inspector who handles a representative bird from each car. When disease is found, the car is marked for disinfection. During six years 65,000 cars of live poultry were inspected. 6,000 cars contained overcropped or otherwise unsuitable birds for unloading. Infectious diseases were found in birds in 1,400 cars. 175,000 sick birds were destroyed. The principal causes of rejection were roup or infectious laryngotracheitis. Over 200,000 birds were condemned from cars other than those in which a general diseased condition existed, the main causes being emaciation, roup, dropsy, bruises, fractures, toxaemia or the fact that the birds were in a moribund condition.

A dressed poultry inspection is carried out by the Bureau of Agricultural Economics, in a group of plants in the north-eastern section of the United States. The inspection is carried out by a veterinary inspector. Nearly 30,000,000 birds have been examined at these plants, 950,000 being rejected as unfit for food. Of these; 65·5 per cent. were tuberculous, 15 per cent. decomposed, 7 per cent. affected with septicaemia, 3·5 per cent. emaciated and 9 per cent. were found in other diseased conditions.

It is considered that the live and dressed poultry inspection has been of real benefit both to the poultry industry and to the consuming public.

II. The Committee requests the continuance of the investigations into the problems of avian tuberculosis, fowl paralysis, laryngotracheitis, pullorum disease, leucosis, fowl cholera and internal parasites. They also request that the veterinary practitioners should manifest a more sympathetic interest in poultry problems and that the veterinary colleges should enrich their curricula with more extensive courses and arrange short courses on poultry diseases for practitioners.

—NORMAN DOBSON.

BAYON, H. P. (1933). **Recent Advances in our Knowledge of Poultry Diseases. Lecture III. Fowl-Pox and Fowl Canker; Coccidiosis.**—*Vet. Rec.* **13.** 940-947. 1 fig.

The author considers that the comb form and the mouth form of the disease are simply different manifestations of the same virus. He states that in the comb form the virus acts on the epithelium of the skin and that in the mouth form the lesions develop on the mucous membranes.

In his experimental birds cross-infection was rare, but he did not state whether he had undertaken any experimental work in this connection. For both forms of the disease he recommended curative treatment, with which most workers will not agree. [It has been shown that the treatment of such affected birds is both scientifically and economically unsound]. The author found that, using pigeon pox vaccine, about one-third of the birds vaccinated failed to "take." [This has not been the experience of persons using the vaccine on a very large scale].

Dealing with coccidiosis, Bayon discusses the incidence, spread, symptoms, aetiology and the life cycle of the parasite. He found that, to obtain a favourable survival rate of the chicks, nothing appeared to be so effective as the addition of skim milk to the mash and a generous diet.

The author considers that the prevention of coccidiosis is a matter of plan or system, not of drugs.—NORMAN DOBSON.

HARBOU, J. (1933). Sterilitet hos Kvaeg. **[Bovine Sterility].**—*Maanedsskr. Dyrl.* **45.** 291-302.

The most frequent and, in the author's opinion, the most important cause of

sterility in cows is chronic catarrhal endometritis. In these cases he has seen extremely favourable results from irrigation with entozon or the insertion of entozon pessaries. Such cases of endometritis often occur in herds in an enzootic manner. On the basis of the favourable effects of the entozon the author believes that these disorders are due to a streptococcal infection contracted at parturition. In a number of cases he has treated heifers, in which sexual function was absent or delayed, with prolan injections, with the result that in nine out of 12 heifers oestrum occurred within 21 days. In seven of the heifers the oestrum appeared within 12 days after the first injection.

—H. C. Bendixen (Copenhagen).

Ilmjarv, M. (1933). 1862.a. Tori kasvandusele ostetud ardenni sugumärade ahtruse põhjuseid. **[The Causes of Sterility in Ardenne Mares bought in 1862 for the Tori Stud].**—*Eesti Loomaarst. Ring.* **9.** 44-51. 3 tables. [6 refs.] [Abst. from abst. in German by H. Richter (Tartu)].

Many Ardenne mares imported into Estonia and mated with Ardenne, Arab or Estonian stallions failed to produce foals. The author examined the records and ascribed the sterility to (1) the undersize of some stallions ; (2) the fact that some of the mares were too old for breeding ; (3) the failure of some mares to become acclimatized ; (4) genital disease and (5) joint-ill infection.

Ardenne mares were not used for breeding after this experience.—J. E.

Smith, A. D. Buchanan. (1933). **Sterility in Farm Live Stock.**—*Scot. J. Agric.* **16**. 282-293.

This article has been compiled from data collected by the Scottish Committee of Research Workers' Sterility Sub-Committee. It is a systematic account of the knowledge of the causal factors of sterility in farm animals, with particular reference to cattle. The matter is dealt with under the headings of disease, nutrition and heredity and reference is made to two recent allied publications on the nutritional and hereditary factors in sterility, published respectively by the Imperial Bureau of Animal Nutrition and the Imperial Bureau of Animal Genetics. [(1932). " Nutrition in Relation to Reproduction with Special Reference to Sterility in Farm Animals " and (1932). " Physiological and Genetical Aspects of Sterility in Domesticated Animals "].—J. E.

Krediet, G. (1933). Kastration intersexueller Säugetiere. **[Castration of Hermaphrodite Mammals].**—*Acta vet. neerland.* **1.** No. 1. pp. 120. 37 figs., 7 tables. [2 refs.] [Orig. in German].

The consequences of castration of normal female or male animals have been known for some time and have become the basis of further research work on gland grafting and hormone therapy. The results with hermaphrodites differ, as these possess both male and female organs and characters.

It appears from recent experiments that hermaphrodites owe their existence to a change of sex, whereby a change of female into male occurs during the foetal development. As with normal animals, it seems probable that the sexual organs and characters are governed by the gonads. Extensive research work was carried out by Krediet on the consequences of the castration of hermaphrodite pigs and goats. The results showed that the gonad has a direct influence on the sexual apparatus and that the hermaphrodite is not an animal possessing mixed properties, but an animal between male and female whose sexual organs and characters are influenced according to the sex characters of the gonads.—A. Klarenbeek (Utrecht).

Ruiz Martínez, C. (1933). Contribución al estudio de la esteatonecrosis. [**Contribution to the Study of Fat Necrosis**].—*Trab. Inst. Biol. anim. Madrid.* **1.** 99-104. 3 figs.

The condition referred to is a multiple focal necrosis of the pancreas in which the tissue necrosis is accompanied by a fat-splitting process. The histopathology of human cases studied by the author is described. His findings are in agreement with the view that the condition is secondary and results from a backward flow of trypsin, which, injuring the pancreatic tissue, allows the pancreatic juice to break down fats *in situ* in the pancreas.

The condition has been reported in adult pigs on several occasions.

—R. S. Roberts.

Patterson, F. D., Wilcke, H. L., Murray, C., & Henderson, E. W. (1932). **So-Called Range Paralysis of the Chicken.**—*J. Amer. Vet. Med. Ass.* **81.** 747-767. 5 figs., 2 tables. [35 refs.]

Under the heading of " Clinical Studies " the authors give details of the greatly varying forms of paralysis, eye changes and other features associated with this condition. The characteristic lesions found in affected nerves are enlargements with lymphoid-like tissue infiltrations. The infiltration tissue is tumour-like and comparatively soft although well organized. Tumour-like infiltrations that are apparently of the same type as those described in the nerve lesions have been found in practically all the organs and tissues of the body, notably in the liver, kidney, spleen [and ovary].

The eye condition is fully described. Experiments were carried out to test the transmission of the condition by means of the injection of a suspension from markedly affected tissues of a typical nerve case, from infiltrated liver and ovary of a hen which did not show any eye or nerve lesions, and infiltrated liver, kidney and ovary of a positive case from the first group. The intraperitoneal route was used in these attempts to infect birds artificially. It is stated that as many as 76·9 per cent. of the birds in some groups became affected. The injection of a suspension made from one type of lesion apparently produces practically all the types that are considered as expressions of this disease. Contact infections are stated to have been successful in as much as 57·8 per cent. in some groups.

The results from Berkefeld filtrate transmission experiments were very irregular and apparently do not warrant definite conclusions being drawn. The age of the birds used in these experiments is not stated.

The progeny of affected females from badly involved flocks were mated to an " apparently " healthy male. In two years time 51 per cent. of the progeny of this mating were positively affected. From this and other experiments the authors draw the conclusion that transmission is through the egg.

The incubation period following intraperitoneal inoculation appears to be about two months. The clinical course of the condition may vary from a few weeks to more than a year. Complete recovery from the condition has rarely if ever been noted.

[It has not been proved that the disease is caused by a virus. The appearance of the disease in the offspring of affected birds may be due to a genetical factor, susceptibility or even infection from contaminated ground or houses, etc.].

—Norman Dobson.

Arroyo Martín, C. (1933). Contribución al estudio del bocio en los animales. Estudio de las alteraciones histológicas en un bocio parenquimatoso tireo ¿paratiréogeno ? en un cordero. [**Contribution to the Study of Goitre in**

Animals. Study of the Histological Changes in a Case of Parenchymatous Goitre, involving the Thyroid, and possibly the Parathyroid, Glands in a Lamb].—*Trab. Inst. Biol. anim. Madrid.* **1.** 116-139. 17 figs. [18 refs.]

The gross and microscopic structure of an enlarged thyroid gland in a lamb are described. Degeneration, with vacuole formation in the cytoplasm and nuclei, was noted in the vesicular cells.—R. S. Roberts.

Cinotti, F. (1932). Osservazioni cliniche sulla " pitirosi " (Malattia da Crusca) negli Equini. [**Clinical Observations on " Pitirosi " (Disease caused by Bran) [Osteoporosis] in Equines**].—*Nuova Vet.* **10.** No. 6, 12-19 ; No. 7, 19-25 ; No. 8, 19-26 ; No. 9, 16-24 ; No. 10, 21-28 and No. 11, 31-36. 60 figs.

The author gives the name " pitirosi " to a bone disease of equines and bovines characterized by acidosis and by a deficiency of lime in the body due to an excessive intake of phosphoric acid in a diet too rich in bran. The disease is assuming an enzootic character in some localities of Campania (Naples), where there are numerous mills. [It also occurs in the Philippine Islands, see this *Bull.* **3.** 264].

The symptomatology is dealt with in detail ; osteomalacia [osteofibrosis ?] is predominant as a *post-mortem* lesion.

The treatment consists in discontinuing the bran and in the administration of calcium carbonate.

For demonstration purposes, donkeys affected with " pitirosis " at the initial stage were fed exclusively with bran *ad lib.* plus increasing daily doses of a phosphoric acid until they were reduced to a marasmatic condition and could not stand up ; a change of diet to hay and straw greatly improved the general condition within a period of 10 to 15 days.

The article is fully illustrated with pictures of affected horses and of affected bones.—F. Veglia (Turin).

Henry, M., & Benjamin, M. S. (1933). **Mineral Deficiency in the Southern Coastal Belt of New South Wales. A Preliminary Survey.**—*Agric. Gaz. New South Wales.* **44.** 11-18, 119-123 and 231-237. 12 tables. [15 refs.] [Also published as *Dept. Agric. New South Wales Sci. Bull.* No. 42. pp. 21 with 1 map].

Clinical evidence of aphosphorosis has been observed in many parts of New South Wales, but especially in the dairying districts of the south coast, where this investigation was conducted. Clinical data have been collected and soil and pasture analyses carried out. The phosphorus content of soils was found to be extremely low in many instances. The average analysis of soils where cattle show definite clinical evidence of deficiency is as follows :—" citrate-soluble " phosphorus (calculated as P_2O_5) 0·0015 per cent., " citrate-soluble " calcium (calculated as CaO) 0·088 per cent., pH 5.45. Pastures from these affected areas contain on the average 0·272 per cent. P, 0·575 per cent. Ca and 8·05 per cent. crude protein.

From areas which are not affected, the following average values were obtained :—(soil) P, 0·0056 per cent. ; Ca, 0·229 per cent. ; pH, 6·08 ; (pasture) P, 0·437 per cent. ; Ca, 0·66 per cent. ; crude protein, 11 per cent. Affected areas appear to have soils with a relatively low percentage of " citrate-soluble " P coincident with a marked acid reaction. Factors which affect the chemical composition and grazing value of pasture are discussed together with the Ca and P content of pasture and stock foods in relation to the requirements of dairy cattle.

—W. I. B. Beveridge.

LESLIE, A. (1933). **Some Aspects of Dental Attrition in New Zealand Sheep. Data from a Canterbury Investigation.**—*New Zealand J. Agric.* **47.** 149-153.

Observations were made at Canterbury to find whether physically hard feeding conditions were actually the reason for excessive wear of incisor teeth. The first changes were noted to be a darkening of the central incisors with erosion and breaking of the surfaces. It is stated that 70 per cent. of ewes are culled for failing teeth one or two years before it should be necessary. Leslie believes that the physical nature of the diet alone cannot be blamed for the defects in teeth, but that other nutritional factors such as deficiency of lime are implicated. Hoggets fed on bone meal and cod liver oil had better teeth than controls, and young dry ewes better teeth than pregnant ewes of the same age.—C. S. M. HOPKIRK.

I. MCGOWAN, J. P. (1933). **Some Observations on Rickets, with Special Reference to its Occurrence in Pigs.**—*Brit. Med. J.* Sept. 30th. 599-602. 5 figs. [28 refs.]

II. SMITH, Jean. (1933). **Phosphatase Test for Rickets.**—*Lancet.* **225.** 549. [1 ref.]

I. Observations were made on rickets in pigs during the period 1922-1931. It is pointed out that an absence of calcium in the diet leads to the onset of osteoporosis, which cannot be cured or prevented by cod liver oil, vitamin D or sunlight. The balancing of the CaO with the P_2O_5 of the ration did not prevent the development of rickets.

The administration of Ca alone does not prevent " latent " rickets developing into " patent " rickets, but cod liver oil is effective in this regard. The true function of vitamin D is discussed in the light of the author's observation. Considerable stress is laid on the necessity for examining the histopathology of lesions, said to be those of rickets, so that errors in research may be avoided.

II. Ordinary artificially fed infants have an increased phosphatase content of the blood plasma. This figure can be reduced by the addition of fat soluble vitamin. A similar increase in the phosphatase content is observed in rickets. Estimation of the phosphatase content may aid diagnosis in rickets.

—GEO. F. BODDIE.

IMMUNITY.

MELLO, A. (1933). Do estudo das reações tuberculinicas não especificas. [**Study of Non-Specific Tuberculin Reactions**].—*Rev. Soc. Paulista Med. vet. São Paulo.* **3.** 74-82. [5 refs.]

A few original observations are recorded, but the article is principally intended to draw attention to recent literature dealing with irregular results obtained with the intradermal tuberculin test.—R. S. ROBERTS.

MENKIN, V. (1933). **Studies on Inflammation. IX. A Factor in the Mechanism of Invasiveness by Pyogenic Bacteria.**—*J. Exp. Med.* **57.** 977-991. 8 figs. on 2 plates, 3 tables. [15 refs.]

An irritant, when introduced into the tissues, sets up an inflammatory reaction which sooner or later causes the formation of a local barrier which hinders the extension of the irritant to the surrounding tissues. This local barrier is a form of mechanical obstruction caused by thrombosed lymphatics or a fibrinous network. The rapidity with which such barriers are formed varies with the irritant.

In this paper an account is given of a study of the relative rapidity with which

Staphylococcus aureus, *Streptococcus haemolyticus* and pneumococcus Type I cause an inflammatory area produced by them to be walled off by such a barrier, the presence of a barrier being determined by the extent to which trypan blue, when introduced into the inflamed area, can drain into the regional lymphatics.

The author found that, when trypan blue was injected into an area of cutaneous inflammation induced by *Staph. aureus*, it failed to drain to the tributary lymphatics when the dye was injected as early as one hour after the inoculation of micro-organisms. In the case of pneumococcus Type I the dye was retained *in situ* when injected about six or more hours after bacterial injection. When inflammation was induced by *Str. haemolyticus*, trypan blue drained away for the first 30 hours, but after 45 hours failed to reach the regional lymphatics.

Inasmuch as bacteria generally spread *via* the lymphatics from the site of infection, it follows that the greater the rapidity of barrier formation caused by a bacterial irritant the less invasive will that organism be and the less marked will be its systemic effects.—GWILYM O. DAVIES.

RAMON, G., & DJOURICHITCH, M. (1933). Recherches expérimentales sur les "vaccinations associées." [**Experimental Research on "Associated Vaccinations"**].—*Ann. Inst. Pasteur.* **51.** 407-418. 5 tables. [8 refs.]

It has been noted previously that, when anatoxin is inoculated mixed with a microbial vaccine, the resultant antitoxic titre is higher than when anatoxin alone is used. The authors have investigated this phenomenon by inoculating groups of guinea pigs and rabbits with anatoxin alone, anatoxin mixed with dead or living vaccines, and anatoxin inoculated separately but simultaneously with such vaccines. Diphtheria anatoxin was used throughout, and the microbial adjuncts used included TAB vaccine, BCG vaccine, the timothy grass bacillus, and *B.* [*Corynebact.*] *diphtheriae.* Antitoxic estimations were made after one and after two injections; the serum was pooled to counteract individual susceptibility as much as possible. The results show that, in general, the highest titres are obtained when anatoxin-vaccine mixtures are used, especially when live vaccine is employed. This is not due to any general reaction to the vaccine, because separate inoculations do not have the same effect, but is concerned with the local non-specific reaction provoked. The titre obtained, however, is not proportionate to the amount of local disturbance set up.—NORMAN HOLE.

ARMSTRONG, C., & HARRISON, W. T. (1933). **Heterologous Experience (Immunization) as a Factor in Resistance to Disease.**—*Publ. Health Rep. Washington.* **48.** 597-609. 8 charts. [38 refs.]

The authors claim to have shown that, by exercising the defence mechanism of the body by copious heterologous immunization, a definite increase of resistance is produced against disease in general. [Unfortunately the authors have not submitted their figures to statistical analysis and, in view of the heavy losses in the various animal groups during the preliminary heterologous immunizations, it is doubtful if the variations in mortality shown have any significance].

—E. J. PULLINGER.

I. VIDAL, J., RUIZ, C., ARROYO, C., & ENRÍQUEZ, C. S. (1933). Aportaciones sobre el poder antigénico de los microbios virulentos y atenuados. [**Conclusions concerning the Antigenic Powers of Virulent and Attenuated Bacteria**].—*Trab. Inst. Biol. anim. Madrid.* **1.** 48-76. 6 tables, 20 graphs.

II. VIDAL, J., RUIZ, C., ARROYO, C., & ENRÍQUEZ, S. (1933). Le pouvoir antigénique des microbes virulents et des microbes atténués. [**The Antigenic**

Power of Virulent and Attenuated Bacteria].—*C. R. Soc. Biol. Paris.* **114.** 102-103. [5 refs.]

I. Two strains of *B.* [*Pfeifferella*] *mallei*, one fully virulent and the other completely attenuated, were killed by heat and inoculated into two groups of six rabbits. The rabbits were bled at intervals of two or three days, a leucocyte count taken and the sera tested for agglutinins and complement-fixing bodies. Some of the rabbits were re-inoculated after three weeks. The reactions obtained were comparable to those recorded by other authors and no differences were observed between the two groups. The authors conclude that attenuation in no way alters the powers of producing antibodies or of increasing the leucocyte count. [The conclusion does not appear to be justified, as no account is taken of possible changes during the process of sterilizing by heat at 60°C. for one hour].

II. This is a brief account of the experiments described in I above.

—R. S. Roberts.

Rich, A. R. (1933). **Experimental Pathological Studies on the Nature and Rôle of Bacterial Allergy.**—*Lancet.* **225.** 521-525. [15 refs.]

The author seeks to differentiate allergy and anaphylaxis from immunity. All available evidence indicates that both the necrotizing-inflammatory (allergic) and the musculo-spasmodic (anaphylactic) types whilst they are readily distinguishable, are fundamentally dependent upon the interaction of antigen and antibody. On the other hand, he asserts that there is no experiment on record which would show that hypersensitiveness is necessary for the operation of immunity.

This point is illustrated by experiments in which allergy was separated from immunity (a) by establishing an immunity to syphilis without engendering allergy ; (b) by passively transferring the antibodies in the serum of allergic, immune animals in which case the immunity was transferred but not the hypersensitiveness and (c) by desensitization by which it was found that immunity operated in the absence of allergic inflammation.

In tuberculosis it has been shown by Rothschild and co-workers that immunized guinea pigs can be completely desensitized and yet suffer no loss in their immunity. Conversely, other authors (Sabin, Seibert, etc.), have proved that the repeated injection of purified tuberculo-protein sensitized guinea pigs to old tuberculin, but that such animals possessed no immunity.—R. E. Glover.

THERAPEUTICS.

I. Roskin, G., & Romanowa, K. (1933). Experimentell-zytologische Untersuchungen über die Einwirkung einiger chemotherapeutischer Stoffe auf Trypanosomen. [**Experimental Cytological Research on the Effect of Certain Chemotherapeutic Substances on Trypanosomes**].—*Zlb. Bakt. I. (Orig.).* **129.** 35-40. [17 refs.]

II. Duke, H. L. (1933). **The Trypanosomes of Man. Their Resistance to Arsenical Drugs.**—*Lancet.* **225.** 553-557. [3 refs.]

III. van Hoof, L. (1933). Essai d'un nouveau dérive antimoine organique, Dn 12, dans la trypanosomiase humaine. [**Dn 12, a New Organic Antimony Derivative in Human Trypanosomiasis**].—*Ann. Soc. belge. Méd. trop.* **13.** 345-366. 1 table. [7 refs.]

I. Describes the testing of the trypanocidal properties of several drugs on mice infected with *Tryp. equiperdum.* The effect of the drugs was judged by their action on the staining of trypanosomes with rongalit white, a leucobase of methylene

blue. This staining is conditional on the presence of a ferment-like factor in the protoplasm which is destroyed by heating, fixation in alcohol or formalin, ultra-violet rays or potassium cyanide. Infected mice were injected with the drug to be tested and blood smears were made at various intervals after inoculation and stained with rongalit white.

After injection of stovarsol, the trypanosomes failed to take the colour of the stain after ten minutes. With salvarsan, the colour was decreased in ten minutes and disappeared in two hours. With neosalvarsan, the staining property was lost in ten minutes.

Treatment with a small dose of germanin did not cause any change within two hours. After 24 hours the nucleus failed to stain, but the cytoplasm still coloured a pale blue. With a larger dose of germanin, the colour disappeared 24 hours after treatment.

With trypaflavine, the nuclear staining was less intense in ten minutes, but the cytoplasm still stained pale blue and the colour had not disappeared after two hours.

II. This article criticizes the assumption of YORKE and his collaborators that, since resistant strains of *T. brucei* and *T. rhodesiense* do not lose their resistance to arsenicals after cyclical transmission through tsetse, the same applies in the case of *T. gambiense*. It is claimed that *T. brucei* and *T. rhodesiense* have a considerable natural resistance to arsenicals, but that *T. gambiense* has not. It has proved extremely difficult to produce arsenic-resisting strains of *T. gambiense* and when such strains have been obtained they have proved to have lost their transmissibility. It would seem that strains of *T. gambiense*, resistant to arsenicals, may not be produced readily in the treatment of human sleeping sickness, and, if they are produced, they may not be transmissible by tsetse.

III. Dn 12, an organic antimony compound, is soluble in water and sufficiently stable not to require to be kept in capsules. Subcutaneous inoculation in the rat would cure *T. congolense* infection, but was not so successful in the cases of *T. brucei* and *T. rhodesiense*.

In cases of human sleeping sickness, it gave good results in early infections, but was not so satisfactory in advanced cases, though in these its combination with trypanarsyl treatment gave good results. Four cases of infections, resistant to arsenic, were cured with Dn 12, but one case was encountered which was also resistant to the organic antimony. Repeated injections of Dn 12 may cause shock, but this can be avoided by preliminary treatment with hypophosphite of soda *per os* two hours before the injection.—U. F. RICHARDSON.

RAJCEVIC, M., & BUTOZAN, V. (1933). Beitrag zur Therapie der Rinderpiroplasmose mit " Todorit." **[Treatment of Bovine Piroplasmosis with " Todorit"].** —*Deuts. tierärztl. Wschr.* **41.** 485-487. [25 refs.]

Bovine piroplasmosis caused by *Babesia bovis* is common in Jugoslavia. This paper gives the results of treatment trials on eight cases which were given intramuscular injections of " todorit," a preparation of unrevealed composition obtained from the chemical firm Kastel of Zagreb. The case records including blood counts are given and it appears that the results were excellent, rapid cures being obtained in every case.—J. E.

JIMÉNEZ RUIZ, M. J. (1933). El stovarsol sódico en el tratamiento de la agalaxia contagiosa. **[Sodium Stovarsol in the Treatment of Contagious Agalactia].** —*Rev. Hig. y San. pec. Madrid.* **23.** 145-148.

The author treated a herd of 640 goats, in which 85 were affected, with a daily subcutaneous dose of 0·25 g. of sodium stovarsol. The more severely

affected animals died in a few days, but the remainder made satisfactory recoveries and animals not clinically affected rapidly improved in condition. [Contagious agalactia affects sheep and goats and is characterized by mastitis tending to lead to gangrene, and by orchitis, suppurative arthritis and keratitis].

—R. S. Roberts.

Weed, L. A., & Ecker, E. E. (1933). **Phenyl-Mercuric Compounds. Their Action on Animals and their Preservative Values.**—*J. Infect. Dis.* **52.** 354-363. 7 tables. [1 ref.]

In two earlier papers [(1931). *J. Infect. Dis.* **49.** 440 and **51.** 309.] the authors described the bactericidal and fungicidal properties of phenyl-mercuric salts. They pointed out that these salts were relatively non-poisonous to animals and might be valuable as preservatives for biological products. In the present paper investigations are described as to the toxicity to animals and the effect on biological products, such as enzymes and vaccines, of phenyl-mercuric-nitrate and phenyl-mercuric-chloride.

The investigations into the toxicity of these compounds were conducted with rats, mice and guinea pigs. The results indicated that, while the two substances are only toxic in relatively large doses, they are irritant to the kidney.

The effect of phenyl-mercuric-nitrate on the action of pepsin and trypsin was investigated ; it was found that digestion was not inhibited.

Vaccine prepared by treating mixed cultures of *Bact. typhosum* and *Proteus vulgaris* with a solution of 1 : 62,500 of phenyl-mercuric-nitrate was found to be dead, but the vaccine retained its antigenic power.

The production of precipitin was not retarded by using phenyl-mercuric-chloride as a preservative for blood.—Geo. F. Boddie.

Aston, B. C. (1934). **What is Limonite? Explanation and Warning.**—*New Zealand J. Agric.* **48.** 110-112. 1 table.

Limonite is an important hydrated iron oxide used extensively in New Zealand for combating " bush sickness," an iron starvation of cattle and sheep, and as a tonic.

Limonite is air-dried, ground without heating and then added to salt ; it makes an excellent lick and is readily taken by cattle and often by sheep. However, a warning is issued that limonite must not be heated, a practice which has recently grown up to facilitate grinding, but which has rendered the limonite inactive and useless as a cure or preventive of " bush sickness." Grinding must also be as fine as possible to get sheep to take the lick. The author warns farmers against adding lime to a lick containing limonite.—C. S. M. Hopkirk.

Riffert, W. (1933). Das Verhalten des Blutzukerspiegels bei der Haemoglobinuria paralytica der Pferde und seine Beeinflussung durch Ergotamin. **[The Influence of Ergotamine on the Blood Sugar Picture in Myoglobinuria paralytica].**—*Inaug. Diss. Berlin.* pp. 45. [72 refs.]

Myoglobinuria paralytica [this *Bull.* **1.** 234.] is a disease accompanied by hyperadrenalaemia. There is an associated obstipation. The glucose content of the blood is sometimes raised, the sugar originating from the liver.

The author concludes from experimental work upon a group of 16 horses that hyperglycaemia when present is divisible into two types :—(1) a so-called liver-cell type associated with a pronounced fatty degeneration of the liver : this type is aggravated by ergotamine treatment and (2) a neuro-hormonal type, in which case the rise in the blood sugar content is controlled by the administration of ergo-

tamin in doses of 0·005 g. to 0·01 g. injected subcutaneously. The drug can be administered as " gynergen " a tartrate of ergotamine.—E. J. PULLINGER.

POISONS AND POISONING.

I. OXER, D. T. (1933). **Some Observations on the Toxicity, for Sheep, of Carbon Tetrachloride.**—*Austral. Vet. J.* **9.** 30-32. 1 table.

II. ROSE, A. L. (1933). **Copper Sulphate Poisoning in Sheep.**—*Ibid.* 63-64.

I. This paper discusses mortality following the use of the drug against liver fluke in Tasmania. Mortality occurred in sheep of all classes, some being on phosphorus-deficient pastures, others being on good pasture and fed supplementary rations and licks. An experiment was carried out with a group of adult in-lamb ewes which were being hand-fed only. These ewes were treated with 2 c.c. of carbon tetrachloride in 3 c.c. of liquid paraffin at monthly intervals. A table summarizes the effect on appetite as shown by decrease in the amount of food eaten. The symptoms which developed after drenching are described as those of somnolence and lethargy rather than depression. Rumination was not stopped even when the loss of appetite was most marked. The average daily amount eaten during the " depression " period was approximately half that eaten before treatment. Sheep recovered four to nine days after treatment and the lengths of the " depression " periods after the last two drenchings were noticeably longer than those following the first two. The author states that, as many thousands of sheep are treated annually, many under conditions which must be similar in some respects to those described, it is difficult to understand why more adverse reports are not received. The question arises as to whether sheep on pasture alone might be affected by impaired appetite to such an extent as to vitiate somewhat the utility of carbon tetrachloride in regular vermicidal treatment.

II. The author records mortality following excessive doses of copper sulphate. Two rams each received 400 grains and ten others each 200 grains of the drug in watery solution. The first two rams died and five out of the ten others also died. The dose of copper sulphate as an anthelmintic for sheep is usually not in excess of 17·5 grains and up to 36-grain doses have been given without causing death. Owing to occasional deaths it is recommended that the dose of copper sulphate with mustard be reduced from 8 to 4 grains for lambs up to three to four months old. The surprising feature of the mortality recorded was the survival of five out of ten rams each of which received 200 grains of the drug. Symptoms and *post-mortem* findings in poisoned sheep were those of an intense haemorrhagic gastro-enteritis.—H. McL. GORDON.

SIGNORI, A. (1933). Numerosi casi di intossicamento da gemme di cerro nei bovini. [**Oak Bud Poisoning in Cattle**].—*Clin. Vet. Milan.* **56.** 636-643. 1 table.

The disease was observed on the Apennine mountains early in the spring when the oak trees were budding and the grass was not yet grown.

From 1924 to 1932 the author treated 60 cases, of which 26 ended fatally. Death occurred from the 5th to the 8th day and recovery from the 10th to the 20th day. Prevailing lesions were gastro-enteritis and glomerulonephritis ; the urine was always clear and transparent.

When anuria was noted, recovery was considered to be unlikely.

—F. VEGLIA (TURIN).

I. —. (1933). **Discussion on Plant Poisoning in Man and Animals.**—*Proc. Roy. Soc. Med. London.* **26.** 1267-1278. [7 refs.]

II. CLAWSON, A. B. (1933). **Additional Information concerning Larkspur Poisoning.**—*U.S. Dept. Agric. Farmers' Bull.* No. 988. Suppl. pp. 2.

I. This is a report summarizing the experiences of the contributors on cases of plant poisoning which they had encountered, or on which they had received reports. Emphasis is laid (ANDREWS) on the important problems of specificity, variation of toxicity and the occurrence of a latent period, based mainly upon South African examples, which have already received publication.

NICHOLSON reported preliminary observations on the toxicity of *Ranunculus* spp. carried out at Cambridge. Feeding tests with *R. acris*, *R. bulbosus*, *R. repens* and *R. ficaria* on rabbits, guinea pigs and sheep showed at first slight diarrhoea in the smaller animals, but no eventual untoward result, whilst a sheep after feeding 47 lb. of *R. ficaria* during eight days showed no ill effects immediately or after six months.

The toxicity of anemonin is relatively low, 0·16 g. per kg. body weight in mice, and 0·28 g. per kg. body weight in frogs, and it is suggested that the oily volatile proto-anemonin from which anemonin is rapidly formed by polymerization is the responsible agent, acting as a powerful irritant, and causing damage as a result of the sequelae of gastro-enteritis.

II. Field observations on the effects of *Delphinium barbeyi* have yielded results requiring some modifications of the conclusions expressed in Bull. No. 988 of the United States Department of Agriculture.

When the fresh leaves of plants which have not yet formed flower buds are eaten within an hour or so by cattle, as little as 0·5 per cent. of the body weight may cause poisoning and 0·7 per cent. may kill. The dose for sheep is higher, definite evidence of poisoning being given by 3 per cent. of the body weight.

The toxicity of the leaves decreases with the maturity of the plant. Reckoned on the dry substance, leaves from the plant in bud are about $\frac{1}{2}$, from the plant in flower $\frac{1}{3}$ to $\frac{1}{4}$, and from the plant in fruit about $\frac{1}{16}$ as toxic as the leaves before flower budding.—G. D. LANDER.

PACHECO, G., & CARNEIRO, V. (1933). Estudos experimentais sobre plantas toxicas. III. Ensaios com 32 novas especies. [**Experimental Studies upon Poisonous Plants. III. Trials with 32 more Species**].—*Rev. Soc. Paulista Med. vet. São Paulo.* **3.** 49-58. [4 refs.]

The authors, continuing previous work, administered varying doses of 32 species of plants to rabbits and in some instances to bovines. All the plants studied were believed by the farmers to be toxic for stock, but toxicity could only be demonstrated in one species (*Coussarea triflora*—Rubiacea). This is of interest, as the plant belongs to the same natural order as *Vangueria pigmaea*, the plant causing "gousiekte" in the Transvaal. The leaves were toxic for rabbits in a dose of 2 g. per kg. body weight. Large doses produced fatal results in 48 hours and a smaller dose in 11 days. There was no suggestion of a long incubation period, as is encountered in "gousiekte."—R. S. ROBERTS.

TECHNIQUE.

EMMERSON, M. A. (1933). **Nerve Blocking in the Dehorning of Cattle.**—*Univ. Pennsylvania Bull. Vet. Ext. Quart.* **34.** No. 52. 5-18. 7 figs. [15 refs.]

This is a good, illustrated, practical article on the dehorning of adult cattle

with particular reference to the use of local anaesthesia, which makes the operation on the standing animal easy and rapid.

The nerve to be blocked is the N. cornualis, a branch of the lacrimal nerve, which runs from the orbital region backwards under the edge of the lateral margin of the frontal bone where it is easily accessible for a hypodermic injection.

The horn should be amputated close against the head by sharp horn shears and the artery can be pulled out by artery forceps with consequent avoidance of the troublesome haemorrhage which is liable to follow this operation. A dressing and bandage is, of course, also necessary. The method is presumably only applicable to animals dealt with in limited numbers.—J. E.

I. Gratzl, E. (1933). Das endoskopische Bild des kranken Luftsackes mit besonderer Berücksichtigung der sog. retropharyngealen (Luftsacklymphknoten-) Abscesse und ihre Behandlung. [**The Endoscopical Picture of the Diseased Guttural Pouch of Horses with Special Reference to Retropharyngeal Abscesses and their Treatment**].—*Arch. wiss. prakt. Tierhlk.* **66.** 445-484. 26 figs. [45 refs.]

II. Gratzl, E. (1934). Untersuchungen über die Morphologie und Funktion der Luftsäcke am lebenden Pferd. [**Morphology and Function of the Guttural Pouches of the Horse**].—*Wien. tierärztl. Mschr.* **21.** 65-78 and 97-106. 1 text fig., 21 figs. on 4 plates. [27 refs.]

I. A valuable literary review and systematic treatise with clinical data from 88 cases of diseases of the guttural pouch and of abscessation of the retropharyngeal lymph glands, which lie in direct proximity to the pouches. The work was carried out at the Medical Clinic of the Vienna Veterinary College.

The endoscope is an indispensable instrument for diagnosing disease conditions of the upper air passages, being the only means of appraising the type of inflammation present. Retropharyngeal abscesses are approachable through the guttural pouches into which they commonly break. The photographs taken through the endoscope are an important complement to the article.

II. A systematic account of the technique of endoscopy of the guttural pouches and auditive tubes in the horse with a detailed account of the anatomical findings. 200 healthy horses were used for investigation. Such a special diagnostic method cannot be described in an abstract and the reader should consult the original with its photographic and endoscopic illustrations. Prof. Wirth's model of a laryngoscope with special detachable ends designed by the author was used.

The author believes that the guttural pouches of the horse have some functional significance in the act of swallowing.—J. E.

I. Dimitrijević-Speth, V. (1933). Eine speziell für Agar ausgearbeitete Methode zur Titrierung der Festigkeit von Gallerten. [**A Special Method for the Titration of the Consistency of Agar and Gelatine**].—*Zlb. Bakt. I. (Orig.).* **129.** 149-157. 2 tables.

II. Konrich, F. (1933). Ueber einzeitige Sterilisation von Gelätinenährböden. [**Rapid Sterilization of Gelatine Culture Media**].—*Ibid.* 158-160. 3 tables. [1 ref.]

I. For the purpose of titrating agar or gelatine solutions, the solution to be tested is heated to 60°C. At this temperature 10 c.c. are thoroughly mixed with 30 c.c. of warm diluting fluid. This latter fluid must be exactly similar to that used in preparing the original solutions. Three uniform pipettes are then filled, closed at both ends and allowed to cool down to 18°C. They are then opened and the amount of fluid which drops from the pipettes in a given time is noted, and the

percentage of agar or gelatine present can be calculated by reference to solutions containing known quantities of these substances. The method has shown itself to be most reliable.

II. In sterilizing gelatine culture media, the ill effects of high temperatures for long periods can be avoided by keeping the autoclave at 120°C. for not more than ten minutes and then allowing the temperature to fall to 100°C. in about 15 minutes.—A. J. WILSDON.

OFFICIAL AND OTHER REPORTS.

NEW ZEALAND. (1932). **Department of Agriculture. Annual Report for 1931-32.** [REAKES, C. J.] pp. 58. 13 tables. Wellington : W. A. G. Skinner, Govt. Printer. [fcp] [1s. 3d.]

A condensed report is first made by the Director-General, Dr. C. J. REAKES, who reviews the position of agriculture and the work of the divisions of the department. Then follow reports of directors of divisions with an appendix containing the work of the Veterinary Research Station at Wallaceville [HOPKIRK, C. S. M.].

The report of the Live-Stock Division [LYONS, J.] contains reference to the various diseases of the country, their prevalence and control, the livestock statistics of the country and the condition of the various livestock industries, such as wool, meat export and poultry.

The report of the Veterinary Research Station gives detailed accounts of the diagnostic work and the work during the year on mastitis, sterility, contagious abortion and grass tetany of dairy cows and of *ante-partum* paralysis, caseous lymphadenitis, pulpy kidney, " circling disease," and foot-rot of sheep. The final portion of the report deals with biochemical work on blood and urine of stock.

The investigational work of the veterinary officers deserves some mention. In mastitis, a scheme has been put into operation, based on the leucocyte count of gravity cream, the cows being grouped for milking purposes in a number of herds, the milk samples being examined monthly from each individual cow. Sterility work, which occupies the full time of two veterinarians, has been carried on intensively on the seminal fluid of the bull, the morphology and bacterial content being very critically examined.

In grass tetany, biochemical work showed the magnesium deficiency observed in Europe, but treatment had been useless up to the time of writing the report.

Sheep work had been carried out in widely separated districts in which temporary laboratories had been set up. " Pulpy kidney disease " had shown the presence of a bacterial toxin ; caseous lymphadenitis was shown as controllable by palpation followed by suitable measures ; *ante-partum* paralysis could be set up by starving the pregnant ewe, while " circling disease " was known to be due to the presence of a specific organism in the brains of sheep. Foot-rot observations suggested that the sheep first of all went through a process of scald of the foot and then became infected by *Actinomyces necrophorus*.

On the whole the New Zealand Department of Agriculture can be commended for the progressive work of its officers and the freedom of the country from serious diseases.—C. S. M. HOPKIRK.

NYASALAND PROTECTORATE. (1932). **Medical Entomologist's Report for the year ending the 31st December, 1931.** [LAMBORN, W. A.]—*Ann. Med. Rep.*

Health Nyasaland Protectorate, 1931. Appendix I. pp. 1-20. 20 tables. Zomba : Govt. printer. [fcp].

This report records the recession of tsetse in Dowa and Fort Manning districts as the result of European and native developments in the vicinity of clearings. The demand for smoke-cured tobacco is producing the gradual deforestation of the area menaced by fly, wood being used as fuel. A study was made of the possibility of the introduction of fly from Portuguese territory by cars. 501 cars were stopped and examined and nine tsetse flies were caught on them, but the possibility of introduction is considered remote. The fly traps used by HARRIS for *Glossina pallidipes* were not found to be of much value as traps for *G. morsitans* in Nyasaland.

The report also records attempts to transmit *Tryp. congolense* from cattle to dogs, baboons and white rats by Tabanidae, *Stomoxys*, *Haematopota* and *Lyperosia ;* the results were negative. In connection with these experiments tabanids were bred in captivity and a study was made of their breeding grounds.

In view of the association of *Tabanus africanus* and *Mansonoides* with *Pistia*, the water lettuce, the latter was investigated as to its value as a food for pigs, and, as it proved satisfactory, it is suggested that natives might be encouraged to keep pigs with a view to reducing the quantity of *Pistia*.—U. F. RICHARDSON.

NYASALAND PROTECTORATE. (1933). **Report of the Veterinary Department for the year ended 31st December, 1932.** [TURNBULL, D. O.] pp. 15. Zomba : Govt. Printer. [fcp].

The chief work of the department continued to be the supervision of dipping tanks, of which there is now a total of 101, apart from private tanks, in the protectorate. Selected natives are trained to supervise dipping and to test the dips. Mortality from arsenical poisoning attributable to dipping was negligible.

The position of the livestock industry is described and a census return is given : there are 183,000 cattle, 96,500 sheep, 236,000 goats, 69,000 pigs, 6 horses and 215 donkeys. A little over 1 per cent. of the cattle, 1 per cent. of the sheep, a few hundred goats, nearly 2 per cent. of the pigs and all the equines are European-owned.

Trypanosomiasis of cattle caused some loss during the year. Eleven tsetse fly belts are known, but no survey has been made. Treatment for cattle took the form of six intravenous injections, each of 25 c.c., of 4 per cent. antimony tartrate at 5-day intervals.

East Coast fever gave little trouble. Dipping reduces its incidence.

Other diseases which occur in Nyasaland are briefly referred to.—J. E.

JAMAICA. (1933). **Diseases of Animals.**—*Ann. Rep. Dept. Agric. Jamaica, 1932.* pp. 12. Kingston : Govt. Printing Office. [fcp].

As Mr. S. LOCKETT, the government veterinary surgeon, was for the last six months of the year acting as Director of Agriculture and subsequently was absent on leave, no systematic veterinary report was compiled. There were no serious livestock diseases to report.—J. E.

SWEDEN. (1933). Det Civila Veterinärväsendet År 1932 av Kungl. Medicinalstyrelsen. **[The Civil Veterinary Report for 1932].** [FRYKHOLM, N.] pp. 43. 23 tables. Stockholm : P. A. Norstedt & Söner.

A highly informative and well-tabulated report of the activities of the state veterinary service. There are 580 qualified veterinarians in Sweden, 420 holding state appointments, so that an unusually accurate view of the state of animal health is available. The report contains sections on the divisions of duties of Swedish

veterinarians, an account of the more important diseases, statistics of food inspection, and pages of tables showing the numbers of animals treated in the various provinces and the diseases observed.

Forty-seven outbreaks of foot and mouth disease occurred, all in the extreme south, involving 764 cattle, 1,296 pigs and a few sheep and fowls. Kr. 225,000 were paid in compensation. Outbreaks were dealt with by compulsory slaughter, and isolation and artificial infection with serum treatment were employed to a small extent on isolated premises.

Anthrax caused 104 deaths in animals, being commonest in the extreme south (Malmöhus). Blackleg caused 31 deaths and swine erysipelas 123 deaths. Swine fever was very rare. *Bact. pullorum* infection was increasing, 27 infected farms being known. Tuberculosis of the udder was found in 160 cows, which were consequently slaughtered. Equine infectious anaemia was rather prevalent in the centre and north of Sweden and 1,319 blood tests gave 473 positive results. Contagious abortion was widespread, but its total incidence is not known.—J. E.

—. (1934). **Report of the Work of the Veterinary Department, South Eastern Agricultural College, Wye, Kent.** [McEwen, A. D.]—*J. South-East. Agric. Coll.* No. 33. pp. 46-48. [3 refs.]

A brief progress report on research work carried out during 1933.

"Struck."—This type of enteritis in sheep was scarce during the year, so no vaccination trials could be carried out. After the dry summer and winter it is expected that it will increase.

Gas Gangrene.—Antiserum for lambing ewes was issued to farmers and was favourably reported upon. The trial is to be continued in 1934.

Johne's Disease in Sheep.—This disease was alleged to have caused severe losses in a flock in 1932. Tests with johnin did not give reliable results and the characteristic intestinal corrugation was not present in animals examined after death, nor were bacteria successfully cultivated on artificial media. Acid-fast bacteria and epithelioid cells were, however, abundant in sections of intestinal mucosa.

Contagious Abortion.—On some farms eradication by blood testing and isolation is in progress and live vaccine trials on non-reactors in other infected herds were begun.

Poultry Disease.—The services of the department are being demanded more by poultry keepers, but staff and facilities do not allow any comprehensive schemes to be undertaken.—J. E.

BOOK REVIEWS.

Topley, W. W. C. [M.A., M.D., F.R.C.P., F.R.S., Professor of Bacteriology and Immunology, University of London]. (1933). **An Outline of Immunity.** pp. vii + 415. 37 figs., 63 tables. [1,351 refs.] London : Edward Arnold & Co. [4to] [18s.]

One is forced to agree with the author when he says, in the preface, that no subject in the medical curriculum is in a less satisfactory position than immunity, and that no sensible or humane person would suggest adding to the burden under which the student of medicine staggers. A study of this book, however, leaves no doubt in one's mind that the student has been placed under a deep sense of gratitude to the author for his labours in producing such an interesting and readable "Outline." The book is in reality far more than an outline and is more in the form of a review of recent knowledge. It will repay study not only by the student

but by anyone who wishes to brush up his knowledge of the large subject of immunity, or any particular aspect of it. The summaries at the ends of chapters are especially helpful to the student. The printing is clear and on good paper, the publishers' part in producing the book having been very well done.

—S. H. GAIGER.

VALTIS, J. (1932). Le Virus Tuberculeux. **[Tuberculosis]**. pp. ix + 237. [16 pp. refs.] Paris : Masson et Cie. [8vo] [Frs. 36].

Valtis has played a considerable part in the establishment of existing knowledge on the filtrable form of the tubercle bacillus and its contributory effects on the pathology of the disease. In this work he puts forward his views, clearly and concisely on various important aspects of the problem of tuberculosis.

The book is divided into four parts, the first of which is devoted to the tubercle bacillus, methods for its isolation and for the differentiation of the three main types, and to tuberculin and its value as a diagnostic agent.

The second part deals with the filtrable form of the tubercle bacillus, the technique for the preparation of filtrates, with culture, pathogenicity, and the role of the organism in the causation of certain atypical localized tuberculous infections.

The third part consists of a discussion on heredity and its influence on the bacillary infection.

The fourth part deals in detail with BCG vaccination.

There are 18 pages of references which should prove useful to those engaged in investigational work on tuberculosis.—T. M. DOYLE.

BAKER, J. R. [M.A., D.Phil., Lecturer in Cytology, University of Oxford]. (1933). **Cytological Technique.** pp. xi + 126. 3 figs. [120 refs.] London : Methuen & Co., Ltd. [8vo] [3s. 6d.]

This small book is one of a series of monographs on biological subjects published by Messrs. Methuen. The author points out that in so small a book it is not possible to cover the whole field of cytology and he therefore confines himself to the technique of making permanent preparations of animal cells, avoiding as far as possible what he describes as irrational methods and choosing those rational methods which have given the best results in his hands.

He gives biographical details of the methods described which add to the interest of the subject. In the first chapter he describes the living cell in minute detail and explains that by ordinary methods of preservation and staining we generally succeed in making the cell most unlifelike in appearance. It is therefore the purpose of the book to describe methods of preserving cells or parts of cells in a lifelike condition, and to explain the technique and results in terms of chemistry. Chapters are devoted to the history of research on fixation and the physical effects of fixatives. Ethyl alcohol, formaldehyde, acetic acid, picric acid, chromic acid, potassium dichromate, mercuric chloride, cobalt nitrate and osmium tetroxide are selected for discussion. Various fixing mixtures are then dealt with, such as Carnoy's, Bouin's, Flemming's, Altmann's, Mann's and da Fano's fluids. The subjects of embedding, staining and mounting receive attention and are discussed in a brief, simple and interesting manner. A few hours devoted to the reading of this little book will be well spent and will give the student a new interest in cytology. A very full list of references and an index will enable him to carry his studies further if he considers it necessary.—LL. E. W. BEVAN.